Railway Age

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When Should Electric Heating Be Used?

THERE seems to be a constantly increasing tendency toward the use of electrical energy for heating purposes in the industries and to a lesser extent this tendency is also being manifested in railroad shops. It is a perfectly natural tendency inasmuch as electrical power lends itself so readily to unlimited variations in control, a factor which is usually of great importance where electric heating is used. Electrically heated baking ovens are becoming common in the larger shops and electric furnaces for heat treatment of steel are also being used to some extent. The fact should not be lost sight of that heating by means of electrical energy is expensive and unless there are other advantages which accrue from its use it may easily prove to be an economic waste. While there are undoubtedly applications of electrical heating which are highly satisfactory from an operating point of view, circumstances may exist which would not justify the expense regardless of how satisfactory such equipment might be from that standpoint. More data on the subject of electric heating would be most welcome; indeed it is quite necessary if proper judgment is to be exercised in its use.

"The Public Be Pleased"

IT IS significant that President Aishton, of the American Railway Association, in both of his addresses to the conventions in Atlantic City this week, emphasized the importance of the great improvement in the relations of the railways with the public which has occurred within recent years. The Mechanical and the Purchases and Stores Divisions deal with technical railway problems. Until within recent years nobody in speaking at one of their conventions would have thought of referring to public relations. The effects produced upon the railway situation by regulation gradually have brought home to railway officers realization of the fact that in a sense the railways are subject to a dual form of management. Their operating and financial results are determined not only by what their officers do but also by what the regulating authorities do and the kind of cooperation they are able to get from shippers and the rest of the public. The public's attitude is largely determined by its personal contact with railway officers and employees and by the service rendered to it. In consequence, every railway officer has become a public relations man in the sense that what he says or does not say, and what he does or does not do, help to determine public sentiment and regulation. There has developed among railway officers in all departments a sincere desire to treat the public as it is entitled to be treated as the most important means of getting the public to treat the railways as they are entitled to be treated. Mr. Aishton has been an outstanding leader in all branches of the work of improving the railways' relations with the public, and whatever he says on this subject is stimulating and helpful.

The Motor Transport Meeting

THE meeting of railroad officers interested in motor transportation questions, which will be held today, promises to be one of the outstanding events of the conventions. Although largely impromptu in character, the discussion of the points raised should be searching rather than superficial. A resumé of the subjects making up the program indicates clearly their wide scope. Beginning with a general discussion of the uses to which the railroads are putting motor vehicles, the program will lead into more detailed analyses of the theories and practical problems of freight and passenger transportation by co-ordinated rail and highway services. Following this will be discussions of specific questions, such as the legal aspects of railroad bus and truck operation, the organization of highway subsidiaries by railroads, and the relative advantages of contractual, subsidiary or direct railroad operation of highway vehicles. Lastly, the proposal to organize a permanent association of railroad motor transport officers will be considered. That the meeting will be largely attended is assured. Many railroads have

designated officers to attend the meeting on their behalf, some of them coming to Atlantic City particularly for these sessions. The success of the meeting does not, however, hinge entirely upon the attendance. Rather, it depends upon the whole-heartedness with which those in attendance take part in the meeting. No set program of addresses has been prepared. In certain instances discussion leaders have been designated, but they will not carry the whole burden of discussion. That burden must be borne by all at the meeting if it is to be a success. The interest in motor transport is keen. Many opinions about certain of its aspects, which are at variance with each other, are held. All opinions, all experiences, at variance or in agreement, should be heard today. Everyone present will have opportunity to participate in the discussions. In fact, it is the responsibility of every man at the meeting to do so. If all accept this responsibility, the proceedings of the meeting will be, beyond question, of great and permanent importance.

Beating a Path to the Tent Door

THE old maxim that the world will beat a path to the remotely situated door of the man who makes a better mouse trap is being proved here. The throng of exhibitors at the motor transport tent is every day proving that when people are interested in anything they are willing to go out of their way to see and learn about it. The motor transport tent, where the exhibit of buses and trucks and highway transport equipment is being held, is not, of course, in the depths of a forest far, far away, but, on the other hand, neither is it quite in the center of the exhibition. But the steps necessary to reach the tent from the convention hall and the hotels are made well worth while by the interest and value of the motor transport exhibit.

Science of Management

THE American Engineering Council has defined engineering as "the science of controlling the forces and utilizing the materials of nature for the benefit of man, and the art of organizing and directing human activities in connection therewith." It is only in compratively recent years, however, that engineers, except in a few instances, have recognized responsibilities beyond those of dealing with the materials and forces of nature. The Management Division of the American Society of Mechanical Engineers, for instance, is one evidence of a growing appreciation of the part which the human element plays in industry from an engineering viewpoint. Progress is rapid in these days and there is a steadily growing group of engineers, industrialists, economists, etc., who have studied critically modern industry and its tendencies and have come to the conclusion that industrial management itself is a science. It is becoming more and more evident that the successful leadership of the human element in industry and transportation is a decidedly intricate and difficult task and should require a special knowledge and training, just as does any profession. This is the basic reason for the greater interest that is now being taken by many industries and by the railroads in what is commonly designated as foremanship training, but which is better expressed by the term leadership training, since it applies to all officers and foremen. One of the most striking developments in the railway mechanical department since the Atlantic City convention two years ago, is the growing appreciation of the importance of bringing up the standards of supervision by promoting the discussion in various ways of the duties and responsibilities of foremen and supervisors. A comprehensive survey of methods of training for leadership in the mechanical department was a feature of the June issue of the Railway Mechanical Engineer.

Give the Foremen a Chance

THERE is a noticeable tendency on the part of some roads this year to send to the convention groups of mechanical department supervisors, in several cases below the rank of general foremen. This seems to indicate an appreciation on the part of the officers of those particular roads of the value of giving the younger men in the organization an opportunity to become acquainted with the manner in which the Mechanical Division functions. In the past three or four years the training of supervisors, particularly the foremen, has taken on a new significance and it is encouraging to know that there are those railway officers who are far-sighted enough to see that the continued progress of the Mechanical Division is to a great extent dependent upon the proper education of those men who a few years from now will be holding more important positions.

Prepare Intelligent Specifications

DURING the discussion of the report on Specifications and Tests for Materials, the importance of the preparation of the proper specifications for material was emphasized. It is a fact that in all too many cases when bids are being asked for on quantities of material, standard specifications are submitted which do not correctly or fully state all of the requirements of the railroad company in the particular case in question. One of the most important factors in the increased operating efficiency of the railroads has been the reduction of delays both in the repairing of equipment and in the operation of that equipment on the road. Many aggravating delays are too often brought about by the necessity of a manufacturer and a railroad company entering into voluminous correspondence because of the fact that intelligently prepared specifications were not submitted at the time bids on the material were asked for. Here, without doubt, is a real opportunity for the mechanical engineer's department to make an investigation of material specifications with the idea of making such specifications sufficiently flexible that they may be fully adapted to the requirements of the many variations of material of a given kind which it is often necessary for the mechanical department to purchase.

Ironing Out Difficulties

THERE is plenty of room for friction and misunderstandings in a large railroad repair plant; this not only within the plant itself, but with other departments with which the shop supervision must come in contact. The fact that many of these contacts are made through correspondence does not help the situation. The ordinary type of occasional staff meeting does something to bring the foremen and supervisors into more intimate contact

with each other, but such meetings are usually pretty businesslike affairs and held under conditions where the men do not feel as comfortable and "at home" as might be desired. The supervisor at one railroad shop point, including representatives from the various related departments, got together last fall in the Railroad Y. M. C. A. building for a little supper. There was some music, an address on leadership and an open forum discussion. It was decided to form a supervisors' club. Once a month this group has held a supper meeting during the winter and spring. This intimate social contact has made the supervisors see each other in very different lights. For one thing, it has humanized the intradepartmental and interdepartmental correspondence and in a large measure has done just what a good lubricant does to a piece of machinery. While there is frequently much good natured raillery, there is sometimes some pretty frank talk. Friction and misunderstandings, however, have been largely eliminated. Not only has the railroad profited but the supervisors themselves seem to be getting a lot more satisfaction and pleasure out of their work.

Voluntary Standardization Not Inflexible

IN a comment in these columns yesterday, it was pointed out that there is danger of future progress in the improvement of freight cars being jeopardized by the adoption of standard car designs if these designs become inflexible, and if the Car Construction Committee does not retain an open mind with respect to suggestions for improvements. There is one factor in the situation, however, which makes it unlikely that a dangerous degree of inflexibility will develop. That is the fact that the American Railway Association is a voluntary organization. As long as the Car Construction Committee is a broadly representative body covering a wide range of railroad conditions and ideas as to the fundamental requirements of car design, and as long as it must depend on the favor of all American railroads for the adoption of its proposals, there is little probability that the committee will not leave the way open for improvements as they develop. In the present standard designs, the most important possibilities for future improvements are well protected by the principle of interchangeable units with respect to many truck parts and to the roofs, ends and doors, which within themselves may be changed with little hindrance. The standard designs, however, will tend to discourage many unimportant variations the merits of which may be doubtful, or at least insufficient to justify the disadvantages of the confusion they would cause in handling of equipment in interchange. No matter how complete the standard designs may be made, it will always be possible to find railroads to back any improvements which they consider to be of value to them.

If these improvements show themselves to be of general value, the American Railway Association must perforce accept them, or its standards will become dead letters. Voluntary standardization is thus automatically protected against inflexibility.

Car Utilization

RAILROAD men are giving much attention, and with profit, to the possibility of more intensive locomotive utilization. Why not more emphasis on car utilization? While the intensity of service secured from car equipment, both passenger and freight, is primarily a problem of operation to be solved by the transportation department, standards of car maintenance, a responsibility of the mechanical department, have a most important bearing on potential car serviceability. When maintenance forces keep journal box conditions, draft rigging, brake equipment and car bodies at the desired high standard of maintenance, they have done much to cut down transportation expense and make possible increased car-miles per car day. Moreover, the speed with which car equipment is overhauled and given general repairs at shops and repair tracks also promotes increased serviceability. This point was strongly emphasized in the closing discussion of the report on shops and terminals yesterday when J. J. Tatum, general superintendent of the car department of the Baltimore & Ohio, made a pertinent motion, tersely expressed and favorably acted upon, recommending that the committee be continued and instructed to consider a car shop system and layout that will insure cars being taken from revenue service in bad order and returned in good condition at the least cost. Interpreting "cost" in its broadest sense to include not only man-hours of labor, and material, but the cost of equipment idle while waiting for and passing through repair shops, the committee will perform a real service in carrying out its instructions. There are, at the present time, two principal methods of handling freight car repairs by the progressive system, in one of which the cars are moved from station to station. In the other specialized gangs are moved from car to car. There are ardent adherents of each of these methods and the committee is in a strategic position to discover the advantages and limitations of each by questionnaires or other means.

Passenger Car Maintenance and Rough Handling

ROUGH handling is a source of irritation to passengers and is the cause of many complaints from the traffic department. From the standpoint of good business, rough handling is an important subject and one that requires more action than has been taken in many cases to eliminate the cause rather than to place the blame unintelligently. A western railroad has taken steps in the right direction by endeavoring to find the causes of rough handling of passenger trains. This investigation has shown that in some cases there has been too much slack between the tender of the locomotive and the head car in the train. It was also observed in a number of instances that there was no buffing compression between the chafing block of the tender and the face plate on the head car, which is an important item in the slack action between cars. Measurements taken when the trains were standing revealed that there was from one inch to three inches slack, which showed that the springs in the buffing mechanism were not adequate to keep them in compression. It was also found that the draft rigging was not sufficient to take care of the slack and, in many cases, the springs were so weak that they gave the train a jerking motion. This defect, when the brakes are applied, causes the cars to bunch violently. Considerble rough handling can be eliminated if the train, from the locomotive to the rear car, has good buffers, buffer springs and draft rigging, adequate for the service in which the train is being operated, and careful inspection and maintenance of these parts will be a big help in obtaining smooth handling of trains.

Today's Programs

IN ADDITION to the sessions of the Purchases and Stores and the Mechanical Division, railway officers interested in motor bus and truck transportation will hold a meeting today. The programs follow:

Purchases and Stores Division, A. R. A.

The meeting will open at 9 a. m., Daylight Saving Time, in the Vernon Room of the Haddon Hall Hotel.

9.00 a. m. Subject 11—Unit Piling and Numbering of Material.
9.30 a. m. Subject 12—Purchasing Agent's Office Records and Office Organization.
10.00 a.m. Subject 15—Store Delivery of Material to Users at Shops.
10.30 a. m. Special Subject—"Stores Delivery", by J. W. Gerber, General Storekeeper, Southern Railway.
10.45 a. m. Subject 17—Control of Line Stocks.
11.15 a. m. Subject 8—Supply Train Operation and Line Delivery of Materials.
11.45 a. m. Subject 7—Workable Rules in connection with the carrying out of the Provisions of Section of the Clayton Anti-Trust Act.
11.50 a. m. Subject 9—Joint Committee on Fuel Conservation.
12.00 m. Reports of Resolutions and Memorials Committee.
12.15 p. m. Report of Nominating Committee and Election of Officers.
1.30 p.m. Adjournment.

Mechanical Division, A. R. A.

The meeting will be held in the Greek Temp'e on the Million Dollar Pier. It will be called to order at 9.30 a. m. and will adjourn at 12.30 p. m.

Discussion of Report on:
Car Construction.
Tank Cars.
Brakes and Brake Equipment.
Couplers and Draft Gears.

Motor Transport Meeting Today

The meeting of railroad motor transport officers will be held in the Ohio Avenue room of the Hotel Marlborough-Blenheim, Blenheim section, today, beginning at 10 o'clock, Daylight Saving Time, this morning. The program and discussion leaders at the morning and afternoon sessions will be as follows:

10 a. m. to 12.30 p. m.

Discussion of Use of Motor Vehicles by Railroads.
Passenger Transportation by Rail and Motor Vehicle, by H. F. Fritch, president, Boston & Maine Transportation Company.
Freight Transportation by Rail and Motor Vehicle, by G. C. Woodruff, assistant freight traffic manager, New York Central.
Legal Aspects of Railroad Motor Vehicle Operation. Regulation, Charter Rights—the I. C. C. Investigation, by A. P. Thom, Jr., assistant general counsel, Association of Railway Executives.

2 p. m. to 4 p. m.

Organizing a Highway Subsidiary, by F. S. Hobbs, manager, New England Transportation Company.
Contractual, Subsidiary or Direct Operation. General discussion.
Should There Be a Permanent Association of Railroad Motor Transport Officers? General discussion.

A large number of railroad officers are in Atlantic City solely to attend this meeting. All other railroad officers interested in the subjects listed are also invited to attend. After the conclusion of the afternoon session, those attending the meeting will visit the exhibits of the bus and truck manufacturers in the motor transport exhibit tent.

Entertainment

10.30 a. m. Orchestral Concert, Entrance Hall, Million Dollar Pier.
3.30 p. m. Orchestral Concert, Impromptu Dancing, Entrance Hall, Million Dollar Pier.
4.30 p. m. Tea will be served in Entrance Hall.
9.00 p. m. Informal Dance. Canadian Night. Special Features. Ball Room, Million Dollar Pier.

Special Train to Chicago

FOR the convenience of people returning to Chicago from the convention, the Pennsylvania will operate a special train to leave Atlantic City 5.45 p. m., eastern standard time, Wednesday, June 16, arriving at Chicago 3.00 p. m. next day. Reservations may be secured at the transportation booth, which is located next to the Remington Typewriter and the enrollment booths on the pier. To insure good space make your reservations early.

Additional Exhibits

THE Independent Pneumatic Tool Company, booth 556-7, is showing a machine for running down grease on side rods cups at engine houses, repair shops, etc. and for quick regreasing where engines are run through terminals on long runs.

One new exhibitor has been added as follows:

HandE Wrench Co., New Bedford, Mass. Monkey and pipe wrenches. Represented by George E. Hemphill, W. M. Craig, and Davis Carpenter. Spaces 921-3-5-7, Machinery Hall.

In addition to the list of exhibits displayed by Manning, Maxwell & Moore as published in Wednesday's *Daily Railway Age* the following specialties should be included: Ashcroft gages and lubricators, Consolidated pop safety valves, Hancock inspirators and valves, Metropolitan injectors, cut-off control gages, and several special types of non-lifting inspirators.

To the representatives for the Gisholt Machine Company the following should be added: C. B. Carr, R. D. Heflin, N. D. James, H. G. Hall, G. E. Thomas, and A. R. Engler.

Otto Best was inadvertently omitted from the list of representatives of the Nathan Manufacturing Company in Wednesday's *Daily Railway Age*.

The following representatives should be added to the Hauck Manufacturing Co.: W. C. Elze, H. Vogelsang, and J. Eschemar.

Yesterday's Entertainment

THE entertainment features of yesterday were marked with large attendances, both morning and afternoon. This was expected because this is a year of larger attendance figures than ever before. All records of previous years are being broken.

In the morning in Entrance Hall an orchestral concert devoted mainly to popular music was given. In the afternoon at 3:30 informal dancing was enjoyed, with tea at 4:30.

In the evening in Entrance Hall there was the grand ball. You will pardon the repetition when we say that it was a *grand* ball. Old-time convention people, who ought to be competent judges, declared it exceeded in attendance and beauty any and every former grand ball—and that is a bold statement to make. At any rate, the ball room never looked prettier and it is doubted if any previous similar function ever was more successfully arranged and carried out.

The ball of last evening was given in honor of Section VI, Purchases & Stores, American Railway Association, with C. D. Young, chairman of the division, as guest of honor. Joe Samuels and his Music Masters furnished a

dancing program of 16 numbers, with many encores, consisting of fox-trots, one-steps and waltzes.

For the marked success of the evening's enjoyment, which necessitated painstaking arrangements and execution, credit should be awarded to the Entertainment Committee in general and the sub-committee in charge, as follows: George T. Cooke, general chairman; F. K. Mays, vice-chairman; N. C. Naylor, chairman; S. L. Bateman, Harry Brock, J. P. Bourke, C. W. Floyd Coffin, Scott Donahue, A. N. Dugan, Jr., W. Fogg, A. G. Johnson, A. D. Morrow, J. A. Benton, J. H. Van Moss, F. W. Venton and S. B. Wight, Jr.

Frisco Orders Gas-Electric Cars

THE St. Louis-San Francisco has ordered four 60-ft. passenger and baggage gas-electric rail cars from the J. G. Brill Company, Philadelphia, Pa.

Meeting of Cornell Alumni

CORNELL ALUMNI attending the convention will hold a dinner at seven o'clock on Monday evening, June 14, in the Traymore. All who expect to attend are requested to register with A. F. Stuebing at the Bradford Corporation booth, space Nos. 554-555.

Breaks in Purchases and Stores Ranks

AMONG the 12 members of the Purchases and Stores Division taken from the ranks by death during the past year, was W. D. Stokes, assistant general storekeeper of the Illinois Central, with headquarters at Memphis, Tenn. Mr. Stokes died at Jackson, Miss., on July 20, 1925. He was for a number of years an active worker in the affairs of the Purchases and Stores Division and served on a number of committees.

The list of members of the Purchases and Stores Division who died since the last annual meeting, as contained in the report of the General Committee, is as follows:

B. Briard, purchasing agent, Chicago Great Western, Chicago.
H. E. Dutton, purchasing agent, Green Bay & Western, Green Bay, Wis.
W. E. Hoyt, division storekeeper, Illinois Central, Water Valley, Miss.
E. C. Juley, general storekeeper, Green Bay & Western, Green Bay, Wis.
W. A. Miller, division storekeeper, Southern, Spencer, N. C.
W. D. Stokes, assistant general storekeeper, Illinois Central, Memphis, Tenn.
J. H. Sweeney, superintendent stores, Erie, Meadville, Pa.
H. B. Henry, assistant to general purchasing agent, Southern Pacific, San Francisco, Cal.
A. W. Abel, stationery storekeeper, Pennsylvania, Pittsburgh, Pa.
A. H. Mead, assistant storekeeper, Pennsylvania, Chicago.
J. C. Fettig, assistant storekeeper, Pennsylvania, Logansport, Ind.
C. F. Hench, assistant storekeeper, Pennsylvania, Lucknow, Pa.

Railway Club Secretaries' Meeting

FURTHER advance was made by the secretaries of railway clubs, at the meeting of their society yesterday at the Marlborough-Blenheim, in their united efforts to agree upon ways and means for increasing their practical usefulness to their respective organizations. As usual there was an extended interchange of experiences, methods and practices, which later will be the subject of committee recommendations to the executive committee of each club for further consideration and action.

The loss of the stimulus derived from the enthusiasm and interest of the late Daniel M. Brady, who founded the society, was keenly felt. Mr. Brady was always ready at these meetings with valuable propositions for the secretaries that resulted in fresh zest and ambitious undertaking. Resolutions paying appropriate tribute to his personal worth, the intensified interest he always showed in the responsibilities of the secretaries, and what he did for the society in many ways were adopted. The chairman of the society, Bruce V. Crandall, took occasion personally to emphasize these sentiments and said that Mr. Brady's co-operation, which had been so freely given, would be always missed in the future meetings and work of the society.

One of the gratifying features developed was the good prospect of enlargement in the near future of the membership of the society and its particular field of operations. This promises to confer added benefit to the various railroad clubs. It was agreed for this purpose to hold a meeting in New York in December that will be of unusual importance to every association secretary in the country and the railway clubs in particular.

The following officers were elected: Chairman, Charles R. Crook of Montreal, secretary of the Canadian Railway Club; vice-chairman, A. T. Miller of the Southern & Southwestern, Atlanta; secretary-treasurer, Harry D. Vought of the New York and Central Clubs.

The roundtable luncheon which followed the business meeting was in many ways the most satisfactory that has ever been held. Nearly every club was represented by its secretary or some other officer, and a protracted interchange of suggestions and ideas took place that laid the foundation for departures hereafter that are expected to promote not only an increased membership, but greater welfare, especially in creating interest in club meetings and larger attendance of members.

R. S. M. A. Nominations

THE nominating committee of the Railway Supply Manufacturers' Association yesterday submitted its report to President Wright. The following were the unanimous choices for officers for 1926-27.

President, W. H. S. Bateman, Parkesburg Iron Company.

Vice-President, Gilbert E. Ryder, Locomotive Superheater Company.

The nominating committee was composed of S. J. Allen, chairman; John Platt, Grofton Greenough, S. P. Bush, J. Will Johnson, Pearl Diamond, George Howard and Charles R. Long, Jr.

Mr. Tatum Honored

J. J. TATUM, past chairman of the Mechanical Division, American Railway Association, was singularly honored at yesterday's session by the presentation of engraved resolutions which read as follows:

"Resolved, that the members of the Mechanical Division, American Railway Association, assembled in convention in June, 1926, take this occasion to express their appreciation to Mr. John J. Tatum for the excellent and painstaking services he has rendered in the performance of duties imposed as chairman and member of the General Committee."

The presentation was made on behalf of the members of the Mechanical Division by W. O. Thompson, New York Central.

Car Inspectors to Celebrate

A MEETING of the committee in charge of the twenty-fifth anniversary program of the Chief Interchange Car Inspector's and Car Foreman's Association was held yesterday. J. J. Gainey, general foreman car repairs of the Chesapeake & Ohio, was unable to be present, but was represented by C. M. Hitch, district master car builder of the Baltimore & Ohio. Other members of the committee present were T. J. O'Donnell, chief interchange inspector, Niagara Frontier Car Inspectors' Association; F. W. Trapnell, chief interchange car inspector, Atchison, Topeka & Santa Fe; W. C. Walsh, American Steel Foundries; T. S. Cheadle, chief car inspector, Richmond, Fredericksburg & Potomac; and R. F. Duysters, Simmons-Boardman Publishing Company.

A complete historical record of the organization from its inception to date will be printed, together with the pictures of all the officers obtainable. The supply men's organization will also be represented, as well as a complete list of membership. This will be a valuable souvenir for all members of the organization for years to come.

R. S. M. A. District Meetings

THE annual district elections for members of the Executive Committee of the R. S. M. A. will be held Saturday morning from 9 a. m. to 11:00 a. m. in Manager Hill's office on the pier. It will be necessary to elect members from the following districts: First, New England states, successor to George W. Denyven; second, New York and New Jersey, successor to W. K. Krepps; fourth, Ohio, Indiana and Michigan, successor to George A. Cooper, unexpired term; fifth, Illinois, successor to L. B. Sherman; seventh, states west of the Mississippi river, including Louisiana, Minnesota and Wisconsin, successor to Sterling H. Campbell.

The annual meeting of the Railway Supply Manufacturers' Association in Convention Hall Saturday at 12 o'clock, noon.

Registration Figures

THE attendance during the second day of the conventions showed a big increase. The total attendance to date is over 1,000 more than at the same time two years ago. The total registration thus far recorded this year is 5,056, which is 1,010 more than at the same time at the last convention. Below is given a table showing the attendance for the last four conventions:

	1920	1922	1924	1926
Division V—Mechanical	490	478	650	775
Division VI—Purchases & Stores	24	16	17	400
Special guests	190	180	305	250
Railroad ladies	344	337	475	650
Supply men	1955	1771	2115	2411
Supply ladies	490	384	484	570
Totals	3493	3166	4046	5056

Registration, American Railway Association

Division V—Mechanical

Adamson, E. A., M. C. B., C. of Ga., Chalfonte
Anderson, F. A., Gen. For., Penna.
Baker, G. T., Gen. Car. Insp., Penna., Deville
Bardwell, R. C., Supt. Water Service, C. & O.,
Beith, Jr., Alexander, For. Elec. Track, N. J. & S. S.
Belk, M. S., Supr. Air Brake, Sou., Traymore
Bender, W. A., Dist. M. C. B., B. & O., Brighton
Bentley, W. F., Spec. Insp., B. & O., Pennhurst
Berry, ... W., Shop Insp., Penna.
Biancardi, J. F., Asst. Ch. Draft., N. Y. C., Pennhurst
Bibb, Arthur, Ch. Draftsman, D. & H., Ritz
Billau, L. S., Asst. Elec. Eng., B. & O.
Bittle, Geo. C., For. Car Dept., P. & R.
Boltwood, Harvey, Asst. Dir. Bur. of Ser., I. C. C., Haddon Hall
Boughton, N. J., Mech. Eng., M. K. T., Traymore
Bonhoff, E. L., Gen. For., Penna.
Bower, B. O., Sec. to Std. Com., M. K. T. Lines, Breakers
Broo, C. W., Gen. Car For., N. Y. C. & St. L., Sterling
Brown, B. O., Asst. Supr. Car Insp., N. Y. N. H. & H., New Iroquois
Brown, E. L., Gen. Car For., Staten Island, Traymore
Burkhard, A. A., Div. Gen. For., N. Y. C., Pennhurst
Burns, R. C., Asst. Engineman, Penna., Haddon Hall
Callahan, F. R., Supvr. of Rep., The Pullman Co.
Cannon, J. M., Ret. Mgr., Pullman Co., Morton
Carlyle, Page, Loco. For., C. W., Dennis
Cassidy, Peter C., Asst. Rd. For. of Eng., P. & R., Dennis
Chandler, Charles, Asst. Eng. of Bridges, I. C., Shelburne
Chenworth, C. J., Eng. Asst., A. C. L., Ambassador
Claar, Chas. N., Asst. R. F. E., Reading, Shelburne
Clark, J H., Supt. Floating Equip., B. & O., Shelburne
Cole, Carter S, Asst. R. F. of Engines, Penna., Dennis
Cooper, A., Ch. Mech. Eng., Cons. Rys. of Cuba. Strand
Crune, S. A., Pres. Buffalo Brake Beam, Dennis
Crumwell, O. C., Asst. Ch. of M. P., B. & O., Chalfonte
Cullman, John, Shop For., B. & O., Princess
Cunningham, W. P., S. M. P., Monongahela, Traymore
Day, J. C., Gen. For., Penna.
De Vilbiss, F. B., S. M. P., Penna., Haddon Hall
Dice, A. T., Pres. P. & R.
Dietrick, J. C., For. Car Dept., Penna., Elwood
Dobson, F. L., N. M., Penna., Chalfonte
Durham, Geo., Gen. Mgr., W. & L. E., Traymore
Eberhard, L. M., Supt. A. C. & Y., Sterling
Egan, James P., Supt. of Car. Dept., N. Y. N. H. & H., Iroquois
Eisenhauer, Geo., Elec. Eng., Erie, Chalfonte
Elder, Jas. E., G. A. B., Supvr., C. M. & St. P., Marlborough
Elsey, W. R., Asst. M. M., Penna.
Elmer, Wm., Spec. Eng., Penna.
Emerson, G. H., Ch. M. P. & E., B. & O., Blenheim
Ewing, C. H., V. P., P. & R.
Falck, F. M., G. M., P. & R.
Farley, J. A., Asst. to Ch. Mech. Off., C. & O., Chalfonte
Ferrier, N. A., Supvr. of St. & M., N. Y. C., Ambassador
Fildes, F. K., Asst. Mech. Eng., Penna.
Flinn, R. H., M. M. Penna., Craig Hall
Fox, G. P., S. S., N. Y. C., Pennhurst
Fringer, D. L. B., M. P. Insp., Penna., Dennis
Fritchey, F. W., Div. M. M., B. & O., Knickerbocker
Gill, C. A., S. M. P., B. & O., Ambassador
Galbraith, E., Ch. Nat'l. Insp., N. Y. C.
Geertz, A. O., M. P. Insp., Penna., Dennis
Gillis, H. A., Aff. Mem., Glaslyn Chatham
Gillies, W. H., Gen. For., L. I., Strand
Gleeson, M. A., Div. M. M., B. & O., Princess
Goff, C. G., M. M. So., Traymore
Goss, W. F. M., Aff. Mem., Purdue Univ., Ritz
Gray, B. H., S. M. P., G. M. & N., Ritz Carlton
Gulick, Henry, Cons. Engr., F. E. C., Brighton
Gusey, W. R., For. Car Insp., Penna. Shelburne
Hall, F. D., Elec. Eng., B. & M., Dennis
Hamilton, H. L., Asst. Eng. of Tests, N. Y. C.
Hamilton, J. T., M. M., N. Y. W. & B., Ambassador
Harper, F. J., Gen. Supvr. of Prod., N. Y. N. H. & H.
Harrell, L. S., Ch. Drafts., C. & O., Ritz
Harstad, C. N., G. M., C. M. & St. P., Marlborough
Hass, H. P., Asst. to Mech. Mgr., N. Y. N. H. & H., Traymore
Hassett, J. C., Mech. Eng., N. Y. N. H. & H., Traymore
Hauer, E. R., Ch. Draft., C. & O., Ritz
Hedman. W. R., Ch Draughtsman, B. & O., Dennis
Henry, W C. A., Eng. M. P., Penna., Chelsea
Herlihy, J. J., M. M., B. & O., Llwellyn
Herter, F. J., Eng. R. S., N. Y. C. & St. L., Ambassador
Higgins S., U. S. Labor Board, U. S. A., Ambassador
Hillary, E. A., V. P., P. & R.

Hogan, P. J., Asst. Sup. Car Insp., N. Y. N. H. & H., Iroquois
Holland, H. L., Drafts, B. & O., Glaslyn
Hood, J. M., Gen. Supt., A. C. & Y., Ritz
Howe, J, Supt. of Shops, B. & O., Marlborough
Howe, J. C., For., Reading
Huber, H. G., Asst. Eng., M. P., W. J. & S. S., Haddon Hall
Humphlett, W. R., M. M., C. N. & L., Lyric
Jarrett, E. E., M. M., Nev. Nor., Knickerbocker
Johnson, Harley A., Dir. of Res., A. R. A., Ritz
Jones, D. S., Asst. to Pres., B. R. & P., Iroquois
Joyce, R. H., Shop Insp., Penna.
Katte, E. B., Ch. Eng., Elec. Trac., N. Y. C., Marlborough
Kiefer, P. W., Ch. Eng., M. P. & R. S., N. Y. C
Kelly, S. R., M. M., So., Ambassador
Kent, Thos. J., Asst. For. Pass. Car Insp., Penna., Albright
Keneipp, Fred, Ch. Insp. Mach., Federal Tank, Brighton
Keensy, R. P., V. P., Donora So., Galen Hall
Kinnaud, L S., S. M. P., C. & E. I., Marlborough
Knapp Arthur, Insp. Eng., N. Y. C., Haddon Hall
Lawson, A. B., Draftsman, B. & O., Glaslyn Chatham
Lawes, T. A., Mech. Eng., (Ret.), N. Y. C. & St. L., Van Ness
Lee, Elisha, V. P., Penna.
Leonard, J. W., M. P. I., Penna., Dennis
Love, C. I., Haddon Hall
Macbeth, H. A., S. M. P., W. & L. E., Ambassador
Mann, A. C., V. P., I. C., Chalfonte
Mann, Eugene C., Chalfonte
Martin, E. H., M. M., B. & O., Princess
Maxwell, H. W., M. M., N. Y. N. H. & H., Strand
Maxwell, J. D., M. M., L. & W., Continental
Mayne, Harry W., Cl., P. & A. C.
McAbee, W. S., Gen. Supt., Union, Haddon Hall
McConnell, C. H., Elec. Eng., P. & L. E., Haddon Hall
McGee, Wm. A., Mech. Eng., N. Y. C, Ambassador
McGuire, J. A., Asst. Gen. For., N. Y. C. & St. L., Knickerbocker
McManamy, Frank, I. C. C., Marlborough
McMillan, A. E., Dist. M. M., B. & O., Princess
McMillan, C. E., S. M. P., G. & W., Strand
McVey, J. W., S. M. P., Cons. of Cuba, Marlborough
Meyers, A. C., Gen. Car For., N. Y. N. H. & H., Fredonia
Middauch, W. H., Div. Car For., Erie, Pennhurst
Mill, J. C., Sig. Engr., C. M. & St. P., Marlborough
Miller, E. B., Dist. M. C. B., B. & O., Lexington
Minick, J. L., Asst. Eng., Penna.
Moriarity, G. A., Gen. Mech., Supt., N. Y. N. H. & H., Haddon Hall
Morris, H. T., Engineering Asst., N. Y. N. H. & H., Ambassador
Moses, E. P., E. R. S., N. Y. C., Pennhurst
Meedham, R. J., Mech. & Elec. Eng., C N., Ambassador
Mullaghy, H. J., Supt., D. L. & W., Traymore
Nicholson, F. G., V. P. & G. M., C. & E. I., Marlborough
O'Brien, T. C., M. M., B. & O.
Ostrander, A. E., Asst. V. P., Am. C. & F. Co., Marlborough
Pattison, Hugh, Eng. Elec. Trac., Virginia
Peasley, B. J., S. M. P., St. L. S. W., Ritz
Poole, P. T., Dist. M. P. Insp., B. & O., Lexington
Porter, C. A., Ambassador
Power, J. A., Ritz
Prescott, C. H., M. M., S. I., New Belmont
Purcell, Mark., Gen. A. B. Insp., N. P.
Quay, F. M., Secy. to V. P. & G. M., L. & N. E.
Quinn, M. H., Supvr. Car Rep., Erie, Pennhurst
Radspinner, W. A., Spec. Eng., C. & O., Strand
Rafferty, C. D., M. M., A. C. & H. B., St. Charles
Ralston, A. L., Mech. Supt., N. Y. N. H. & H., Ritz
Rankin, Wm. E., For., Reading
Rhodes, R. S., Asst. Eng. Dept., N. Y C., Dennis
Rice, Jere L., Insp. of Safety, P. & R.
Richers, G. T., M. M., Penna., Traymore
Ream, A. H., S. M. P. & E., P. & S., Chatham
Robb, E. H., Asst. Eng., M. P., L. I., Dennis
Robinson, W. R., N. Y. C. & St. L., Rio Grande
Rogers, John L., Asst. Dir., Bur. of Ser., I. C. C., Marlborough
Rosse, James A., M. P. Insp., P. & R.
Rudulph, J. R., Prod. Eng., L. I., Strand
Runkle, David F., For. Car Dept., P. & R., Regent
Schmoll, G. A., Supvr. Loco. Main., B. & O., Marlborough
Scarr, F J., Suprv. Motor Service, Penna.
Seaver, J. T., Asst. Eng., N. Y. C., Traymore
Sharpley, J. E., Elec. Eng., Virginian, Chelsea
Shay, J. M., M. M., B. & O., Princess
Sheahan, J. F., Mech. Eng., A. B. & A., Haddon Hall
Sheehan, J. E., Ch. Car Insp., N. Y. N. H. & H., Pennhurst
Sheridan, T. F., Ch. Cl. to S. M. P, P. & L. E., Schlitz
Sindall, G. E. M., Gen. For., Penna
Slenker, Charles A., For., L. I., Pine Hall
Smethurst, T., S. M. P., Mex. Ry., Dennis
Smith, E S., M. C. B., F. E. C., Ambassador
Smith, R. D., M. M., Interstate, New England
Smith, W. C., Dev. Eng., Pullman Co.
Stader, T. A., Eng. of Test, C. & O.
Stanton, E., C. I. I., N. & P. B. L., Osborne
Stellwagon, W. B., Asst. For., P. & R., Regent
Stewart, T. R., Supt. of Shops, B. & O., Haddon Hall
Steinberger, M. F., Spec. Eng., B. & O., Knickerbocker
Stohlberger, Philip, M. M., Reading
Stone, Walter C., Mech. Supt., Am. Ref. Transit Co., Haddon Hall
Taylor, Clarence A., Ch. Cl. to S. R. S., N. Y. C., Sterling
Teed, Frank, Gen. C. For., B. & O., Llewyn
Totten, E. C., Div. Gen. Car For., N. Y. C.
Truitt, J. L., M. P. Insp., Penna., Dennis
Van Buskirk, John H., Mech. Eng., N. Y. C., Chalfonte
Vernon, J. B., Gen. For., Virginian, Ambassador
Walsh, W. F., Dis. Mgr., Galena Signal Oil, Chalfonte
Waring, F. M., Eng. of Tests, Penna.
Warren, H. M., Elec. Eng. D. L. & W., Brighton
Waterfield D. B., Shop Eng., C. & O., Ritz
Webb, F. W., M. M., G. M., Monticello
Wells, L. S., Elec. Supt., L. I., Marlborough
White, R. C., Asst. Gen. Mgr., Mo. Pac., Traymore
Williams, Ernest V., S. M. P., R. F. & P., Chalfonte
Wilkinson, B. L., Draftsman, N. Y. C., Pennhurst
Winterrowd, W. H., Marlborough
Winslow, C. G., Asst. Elec. Eng., M. C., Dennis
Withington. S., Elec. Eng., N. Y. N. H. & H., Ambassador
Wright, G. C., Gen. Car Insp., Penna., Sterling
Wright, Roy V., Mgr. Ed., Railway Age, Dennis
Wood, P. O., Asst to Gen. Mgr., Me. Cent., Ambassador
Wyle, Bruce, Asst Elec. Supt., P. & R.
Yorke, N. R., Ch. Mech. Insp., N. Y. N. H. & H., Iroquois

Division VI—Purchases and Stores

Aikens, B. A., P. A., M. C., Shelburne
Anderson, E. E., Clerk, Reading
Arnoll, R. C., P. A., Rutland, Chalfonte
Beyer, L. B., Clerk, Reading
Blizzard, Jos. M., Asst. Stk. Penna.
Bosler, Martin C., Stk., Reading
Brown, N. J., S. K., B. & O., Monticello
Byham, D. E., Stk., Penna.
Churchill, C. S., V. P., N. & W., Marlborough
Clem, W. A., Asst. P. A., Reading
Corbin, A. B., S. K., Penna., Monticello
Coulter, A. S., Clerk, Reading
Deery, J., Asst. P. A., Penna., Traymore
Dibble, C. C., Gen. Supt. of Stores, N. Y. C., Ritz
Diehl, W. J., P. A., Mo. & O., Knickerbocker
Dyson, C. H., Asst. Fuel Agent, B. & O., Ritz
Endy, Wm. N., S. K., Reading
Enhart, E. D., Lumber & Tie Agt., Penna., Haddon Hall
Frank, D. E., Stk., Reading, Haddon Hall
Frazee, Wm., Asst. Off. Mgr., Penna.
Gougeon, A. J., Penna., Dennis
Grammer, Percy L., Asst. to P. A., Penna., Ambassador
Hagerty, J. W., Clerk, Penna., Apollo
Hoffman, Jr., Philip H., Stationer, Penna., Knickerbocker.
Holt, F. W., Asst. P. A., Erie, Knickerbocker
Johnson, P. J., S. K., Penna., Monticello
Jordan, J. J., Stk., D. L. & W., Strand
Keliher, Edward J., Clerk, A. C.
Kohler, L. G., Div. Stk., B. & O.
Kreglow, A. F., S. K., Wash. Term., Chalfonte
Kukis, J. J., Supt. Stores, Erie, Continental
Le Fager, S. W., Penna.
Loos, L. K., S. K., Reading
McGill, C. H., Spl. Tr. S. K., N. Y. N. H. & H., New Iroquois
Mellor, H. K., Supvr. Cl. P. A. Dept., W. J. & S.
Moffatt, W. C., Gen. S. K., Hudson Coal Co., Fredonia
Mohr, Harry, S. K., Reading
Moke, F. A., Asst. S. K., Penna., Craig Hall
Montgomery, S. H., Penna., Apollo
Murray, Park W., Clerk, Penna.
Painter, C. R., Asst. to V. P. Stores, N. Y. N. H. & H., Shelburne
Phillips, J. P. H., Req. Marker Pur. Dept., Penna.
Pidcock, C. W., Jr., P. A., Ga. Nor., Chalfonte
Remensnyder, E. J., Asst. to P. A., Penna., Ambassador
Reynolds, D. E., Penna., Shelburn
Riley, Andrew, Assist. P. A., N. Y. O. & W.
Schultz, Geo. H., Coal Agt., Penna., Ambassador
Sheppard, F. C., Penna.
Simpson, W. I., Penna., Apollo
Smith, T. Leo., Stk., R. F. & P., Haddon Hall
Stegall, G. S. K., Interstate, New England
Stehner, J. H., Clerk, Penna
Swan, Frank T., Asst. P. A., L. N. E.
Trump, J. William, Asst. For., Reading
Vogt, W. F., Asst. Gen. Stk., Penna.
Wasson, E. S., Stationer, Erie, Standton
Wharton, J. E., S. K., Penna., Knickerbocker
White, G. D., S. K., Penna.
Widdoes, John O., Clerk, Penna., Stanton

Special Guests

Akahoshi, Tomoharu, Resident Rep., Japanese Govt. Rys., Chelsea
Angel, C. M., Draftsman, C. & O., Shelburne
Apfelbaum, Edward, Penna., New England
Apgar, Albert R., Electrician, Penna.
Baker, J. H., Knickerbocker
Bank, J. I., Gang For., Penna., Marshbank
Bartholomew, W. E., Gen. Shop Insp., Penna.
Becker, Howard W., Trav. Frt. Agt., Reading
Beitelman, Edwin J., Elec., L. V., Glaslyn
Bennett, H. J, Retired Gen. For., Penna., New England
Bentley, W. F., Spcl. Insp., B. & O., Pennhurst
Benton, Arthur, Gen. Car Insp., Penna.
Bland, S. A., Secy. S. M. P., N. & W., Ritz
Branson, C. E., Cl. Pur. Dept., Penna.
Brittain, W. W.
Brown, H. F., Asst. Elec. Engr., N. Y. N. H. & H., Ambassador
Brown, W. S.
Buck, G. A., Div. Frt. Agt., Reading, Royal Palace.
Caine, W. N., Pass. Agt., Pullman Co., Sterling
Call, A. M., For. Car. Insp.
Cash, Oscar C., Ch. Insp. Safety Appliances, U. S., Elberon
Cathcart, H. W., Fuel Insp., P. & R.
Celian, S. J., Clk., Penna., New England
Clay, M. F., Mat. Insp., M. K. T.
Conlin, Jas., Spec. Insp., B. & O., Lexington
Cooper, W. E., Insp., Bureau of Explosives, Traymore
Cozzens, D. E., Pass. Agt., Pullman Co., Sterling
Cromwell, J. E., Apprentice Instr., B. & O., Pennhurst
Deichmiller, F. J., Stanton
Donovan, M. J.
Drew, Geo W., For. M. P. D., L. I., Albro
Fitch, B. F., Pres., Motor Terminals Co., Traymore
Franciscus, David L., Smoke Insp. Reading
Frietche, F.
Geever, A. P., Secty. to V. P., Sou., Dennis
Goldey, Paul R., Supt., Atlantic & Suburban
Gott, Frank, Prudential Oil Co., Brighton
Grafinger, Paul, Asst. For., L. I., Elberon
Gretter, Joseph J., Auditor, Federal Tank Line, Brighton
Griffith, H. C., For., Penna.
Hamilton, R. E., V. P. & G. P. A., S. & W., Ambassador
Hardy, R. A., Draftsman, Reading
Haverstick, Park W., Supvr. Track, Penna.
Heck, Harry J., Pennhurst
Heitz, Chas. T., Ser. Police, P. & R.
Hess, Al. C., Sec. to V. P., F. E. C., Brighton
Howard, C. L., Sec., Western R.R. Asso., Ambassador
Hughes, R. J., P. & R., Marshbank
Inomata, M. Y., Mech. Eng., Jap. Govt. Rys., Chelsea

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Conventionalities

Among the many early arrivals this year were Mr. and Mrs. John D. Hurley, of Chicago. Mr. and Mrs. Hurley reached the Marlborough-Blenheim Sunday morning. Last summer they were in Europe, where Mr. Hurley was looking after the foreign business of the Independent Pneumatic Tool Company, of which he is president.

C. U. Ziegler, who for the past 16 years has been in the service of the Florida East Coast, as chief electrician, has joined the ranks of the supply men and is attending the convention as service engineer in the Florida-Cuba district for the Simplex Wire & Cable Company with headquarters at St. Augustine, Fla.

An indoor golf contest is being staged at the booth of the Safety Car Heating & Lighting Company and golfers are invited to enter. A scientific machine designed by a prominent railroad golfer has been installed which measures the length of your drive. A record of each day's play will be kept and the name of the player making the high average posted.

Until yesterday we were not sure that H. M. Perry, consulting engineer of Edwin C. Woods & Co., would be with us this year. We would have missed him. All records show that Mr. Perry holds the honors for attendance at the greatest number of these conventions. His record this year is one of attendance at 55 conventions. Some record, we'd say.

R. C. Burns, assistant engineer of the Pennsylvania Railroad at Altoona, arrived Thursday. Mr. Burns shows no ill effects from his strenuous week as presiding officer and president of the Air Brake Association at its meeting in New Orleans last month. At that time Mr. Burns had the pleasure of welcoming the largest attendance at any meeting of the Air Brake Association. There was no lack of enthusiasm and much was accomplished in a short time. The next meeting will be held in Washington, D. C., in May 1927.

Convention activities in Atlantic City this week afford many oddities but if a contest were held to select the most unusual sidelight of the convention the winner would likely be the fact that the chairmen of the two associations meeting this week are both officers from the same railroad. It is also to be observed that J. T. Wallis, chairman of Section V—Mechanical, and C. D. Young, chairman of Section VI—Purchases and Stores, of the A. R. A., are both graduate mechanical engineers. The Pennsylvania, it must be said, enjoys the lion's share of the honors of the day.

D. F. Crawford, formerly general superintendent of motive power of the Pennsylvania Railroad Lines West, and now vice-president and general manager of the Locomotive Stoker Company, is keeping up his good record for attendance at A. R. A. conventions. He joined the Master Mechanics' Association in 1899, has served as president of the Master Mechanics' and Master Car Builders' Associations, and was a member of A. R. A. committees from 1903 to 1918. Since the last convention Mr. Crawford has been in Europe as a delegate to the International Railway Congress on behalf of the United States Government. During his European visit he had an opportunity to study railroad conditions in conjunction with N. M. Lower, assistant general manager of the Locomotive Stoker Company, who accompanied him.

C. L. Bardo, who arrived yesterday, will be remembered by most of those at the convention as general manager of the New York, New Haven & Hartford. He is here this year as vice-president in charge of production and railway sales engineering of the American Brown, Boveri Electric Corporation.

Albert Faulstroh can, in all probability, claim the distinction of coming the greatest distance to attend the convention. He arrived Tuesday at New York from Frankfort, Germany, on the ship Columbus. Mr. Faulstroh represents the Jakob Faulstroh Company, manufacturers of machine parts and drop forgings. The purpose of his visit is to purchase machine tools.

H. B. Gardner, one time representative of the Locomotive Stoker Company and of the Westinghouse Air Brake Company, comes to the convention this year as general sales manager of the Westinghouse Friction Draft Gear Company, to which position he was appointed on June 1, when Westinghouse draft gear activities were assumed by that company.

It has been discovered that A. W. Munster, purchasing agent of the Boston & Maine and chairman of Division VI during 1925, is attending this year's convention after having only recently returned from Germany where he placed orders for 15,000 tons of rails. The rail order included 4,000 tons of 85-lb. rail and 11,000 tons of 100-lb. rail. It is understood that the first shipment of rail has been received.

G. P. Baldwin, vice-president of the General Electric Company in charge of electrification, is attending his first convention this year. Mr. Baldwin has been identified with this company for many years. He was formerly manager of the Pittsburg office, later being made manager of the whole Atlantic district with headquarters at Philadelphia. He afterwards reorganized the merchandising department and was placed in charge of general merchandising which position he held until he assumed his present work.

F. H. Becherer comes to the convention this year in a new connection. Two years ago when he was here he was connected with the car department of the Boston & Maine. In the interim he was appointed assistant to the mechanical superintendent of that road in charge of personnel work. He recently went with the Jersey Central as superintendent of the car department. Mr. Becherer was remarkably successful in assisting in the building up of the Foremen's Educational Clubs on the Boston & Maine, and was given a great ovation at the final joint meeting of these clubs at Boston a few weeks ago.

Among the enthusiastic visitors at the A. R. A. conventions is Miss Marjorie Bartholomew, who motored down from Pittsburgh to this year's assembly with her brother John, a representative of the Westinghouse Air Brake Company in automotive brake activities in the New York district. Perhaps Miss Bartholomew inherits her liking for convention activities, because her father W. S. Bartholomew, president of the Locomotive Stoker Company, has attended every convention held during the past 30 years. He is here again this year greeting his many acquaintances among railroad men.

The absence this year of Mrs. George A. Barden, Philadelphia, will be noted. Mrs. Barden, with her husband, has been a regular attendant at the conventions for many years. She passed away two weeks ago, following a long illness. Mrs. Barden had endeared herself to many of the convention people through her personal charm and loving character.

E. H. HAGENSICK, who in past years, has attended the convention as electrical engineer of the Union Pacific, is here this year as representative of the Pyle National Company with headquarters in St. Paul, Minn.

Harold F. Welch and Mrs. Welch motored down from Hamilton, Ohio, where Mr. Welch took up his new duties as general sales manager of the Niles-Bement-Pond Company several months ago.

Mr. and Mrs. B. P. Flory are accompanied to the conventions by their daughter, Miss Eleanor. The young lady is a student at Southern College at Petersburg, Va., and this is the first of the conventions at which she has been a visitor.

Mrs. Leroy S. Wright, Chicago, wife of the hard-working president of the Railway Supply Manufacturers' Association, after placing the little Wrights in a safe place for a few days, arrived in Atlantic City on Tuesday. This is Mrs. Wright's first convention. She is enjoying meeting the many friends of her popular husband.

S. G. Down, vice-president of the Westinghouse Air Brake Company, is maintaining his good record for attendance at the Mechanical Division conventions. The first meeting of the association which he attended was 20 years ago and he has been active ever since in convention affairs.

Harry U. Morton, Chicago and Palm Beach, Florida, accompanied by Frank N. Grigg, Washington, D. C., both interested conventionites, arrived in Atlantic City on Wednesday. Mr. Morton was for many years one of the leading mechanical men of the Pullman Company. He has invented and perfected several passenger car specialties.

Graduating from Lehigh University, H. E. Passmore, Jr., son of H. E. Passmore, of the Davis Brake Beam Company, has become a full-fledged supply man through his acquisition to the ranks of the National Tube Company. When the father and son met at Atlantic City they discovered that the exhibit booths of their respective companies on the pier were next to each other.

C. H. Kelly, district storekeeper, Lehigh Valley, Sayre, Pa., has the right idea of "safety first." He had the misfortune to cut his finger while unwrapping the model material rack sent for exhibition at the Purchases and Stores convention by the stores department of the Lehigh Valley. Although the cut was not serious he immediately sought first aid at the hotel instead of wrapping the injured finger in a soiled handkerchief.

J. Dickson, superintendent of motive power of the Spokane, Portland & Seattle, and also of that railway's bus operating subsidiary, the S. P. & S. Transportation Company, reports that the 30 White buses his company owns were operated during 1925 at a cost of only 18.4 cents per mile. This operating cost is considered exceptionally low for buses of the 29-passenger type, such as the S. P. & S. operates.

Mr. and Mrs. C. E. Fuller plan to sail from New York on the Franconia on July 3. They will land first in England and take a motor trip through Great Britain. They will then go to France and take an extended motor trip through that country, Switzerland and Germany and may finally go to Italy. They expect to be gone until about January 1, 1927. Since Mr. Fuller retired from railway service he and Mrs. Fuller have travelled extensively, having made one trip around the world.

For thirty odd years, Walter E. Coffin, of the National Malleable & Steel Castings Company, has attended the mechanical conventions. He is not here this year because of illness.

C. B. Williams, purchasing agent of the Central Railroad of New Jersey, was one of the early arrivals this year. He and Mrs. Williams and their son, Fred, are at the Traymore. Mr. Williams is enthusiastic in his praise of the exhibit.

That there are brides attending the convention has been disclosed in the arrival of J. E. Anderson of the Electro-Motive Company, St. Louis, Mo. His friends are congratulating him upon bringing Mrs. Anderson, who is here for the first time.

Talk about your "High Hat" stuff, Searles Rose, of Brubaker, has one with a "King Tut" band. A nice thing about Rose's hat is he can change the band as occasion demands. Out at the Bailer Markers' convention we noticed a "Jersey Cream" color. It will work into a regular rose after a while.

The whim of a five-year old child is responsible for the attendance at the convention for the first time in 14 years of E. E. Davis, president of the Davis Boring Tool Company, St. Louis. His grandson wanted to see Atlantic City, so he took this occasion to show him the sights of the playground of America.

Among the visitors at the convention this year are two railroad men from Japan, Kenji Ossaka, mechanical engineer of the Japanese Government Railways, and Tomokarn Akahoshi, resident representative of the Japanese Government Railways. Messrs. Ossaka and Akahoshi are stopping at the Chelsea.

The only full blooded American on the pier is with the J. B. Ford Company at booth No. 519. He is Chief Little Bear, a Cherokee Indian who has been in the employ of the Ford Company for 20 years as a trade mark and entertainer. He makes his headquarters at Cleveland, Ohio, and has attended all but one of the railway mechanical conventions held at Atlantic City.

W. B. Moir, general car inspector of the Pennsylvania at Pittsburgh, Pa., arrived Wednesday much elated over the prospect of soon joining his wife who has been seriously ill in California. He reports that special attention is being given to the artistic decoration of the interiors of the twenty-four new dining cars now being built at the Altoona shops.

George Thomas, 3d, who with his associates and sales staff of the Parkesburg Iron Company have been in their regular space 388 for so many years, is among those missing this year. Mr. Thomas had an operation a short time since. He is improving, but is not strong enough to make the trip. He is in the Jefferson Hospital, Philadelphia, and will be glad to hear from his friends.

Miss Virginia Weatherly, charming daughter of Mr. and Mrs. R. H. Weatherly, was married at her parents' home at New Rochelle, N. Y., to Val P. Hattemer at 4:30 o'clock on Tuesday afternoon. The young couple sailed for Bermuda where they will spend a few weeks' honeymoon. On their return they will probably take up their residence at Phillipsburg, Pa. Mr. Weatherly arrived at the conventions on Wednesday, but Mrs. Weatherly probably will not come down this year. Mrs. Hattemer is well known to many of the convention visitors, since she has accompanied her parents to Atlantic City on several occasions in the past.

Second Session, A. R. A., Div. V

Full Time Occupied by Discussion of Reports on Arbitration Committee, Prices, Material Tests and Loading Rules

YESTERDAY morning's meeting of the Mechanical Division was called to order by Chairman Wallis at 9.30 and after the announcements for the day by Secretary Hawthorne the Report of the Arbitration Committee was read by the Secretary at the request of Committee Chairman Demarest.

Report of Arbitration Committee

T. W. Demarest
Chairman

The fact that the Arbitration Committee decided and sent reports to members concerning 92 cases is indicative of volume of work the committee is called on to do in answering questions and interpreting the Rules of Interchange. In addition to its regular duties the Committee has to pass on recommendations made by other committees or associations. For instance, during the past year the Railway Accounting Officers Association has recommended that the Interchange Rules be modified whereby all charges for repairs amounting to 25 cents and less per car be omitted. It is alleged that the cost of preparing the original record, billing repair card, pricing, rendition of bill and the checking is as great or perhaps greater than the average of these small charges. One of the important changes recommended by the committee in this year's report is the modification of Rule 66, whereby the three paragraphs in the present form are considerably modified and ten paragraphs are added in which specific instructions are given as to how, when and where and the responsibility for the maintenance of journal packing and parts.

During the year Cases 1384 to 1476, inclusive, have been decided and copies sent to the members. A copy of these decisions is made part of this report. A vote of concurrence in the decisions is respectfully requested by the committee.

There has been referred to the committee a recommendation of the Railway Accounting Officers Association that the Interchange Rules be modified whereby all charges for repairs amounting to 25 cents and less per car be omitted. In support of this recommendation, it is alleged that the cost of preparing the original record, billing repair card, pricing, rendition of bill and the checking thereof, is as great or perhaps greater than the average of charges amounting to 25 cents and less.

Several railroads have already made investigation of the situation on their individual lines and, by agreement between themselves, are suppressing such charges. While these investigations may represent conditions peculiar to individual roads involved and justify the action taken, they may not represent conditions obtaining as a general proposition throughout the country as a whole. In order, therefore, that your committee may have some definite information as to costs of preparing the said charges and rendition of bills, a sub-committee has been appointed to make a study of the situation.

This sub-committee has selected some 10 or 12 representative roads throughout the country on which there are different systems in effect as to preparation of billing repair cards, etc., which roads are being requested to make a study of one month's account of their incoming and outgoing bills against the larger railroads and all private car lines. The information thus obtained will indicate the items of repairs amounting to 25 cents and less, the frequency of such repairs appearing in the bills, the average amount of such charges, the percentage of such charges to those over 25 cents and the percentage of money represented as compared with total amount of the bill.

These studies have already been completed on several roads and should all be completed in the very near future. When received they will be carefully analyzed and such recommendations made to the association with respect thereto as seem appropriate to your committee.

Attention is again called to the fact that the Arbitration Committee will not consider questions under the Rules of Interchange, unless submitted in the form of arbitration cases as per Rule 123.

Freight Car Rules

All recommendations for changes in the Rules of Interchange submitted by members, railroad clubs, private car owners, etc., have been carefully considered by the committee and, where approved, changes have been recommended.

Rule 2

The committee recommends that Sections (f), (g) and (h) of this rule be modified as follows:

Proposed Form: (f) *Transfer authority will not be issued account of the following defects:*

1—All truck defects on home cars.

2—All truck defects on foreign cars, except *defective* metal bolsters or center plates cast integral therewith, *defective* truck sides and transoms, defective non-A. R. A. standard journal boxes where the A. R. A. standard is not a proper substitute.

4—Defective body center plates where not cast integral with bolster, all cars.

5—Defective *or missing* body center plate bolts *or rivets, whether or not they pass through center sills,* all cars.

6—Defective *or missing* center pins.

7—Renewal of any *or all* roof boards on outside *wood* roofs and inside metal roofs, where purlines, *carlines,* ridge pole and plates are in good condition, all cars.

8—Defective or missing side doors, end doors, roof doors and hatch covers, all cars.

9—*Any other defects which can be repaired under load, or if car is safe to run and safe for lading, the receiving line to be the judge. Note: The word "defective," as used in the foregoing, is intended to mean that the part or parts referred to are defective to the extent that, in the judgment of the receiving line, immediate repairs or renewal are necessary.*

(g) A. R. A. Car Service Rule 14 will apply (see page 230) when transfer or rearrangement of lading is necessary, *including application of proper door protection as required by the Loading Rules.*

Reason—To facilitate movement of cars through interchange and avoid unnecessary transfers.

Rule 3

The committee recommends that the effective date of the second paragraph of Section (b) be extended to January 1, 1928. The present situation justifies this extension.

The committee recommends that new sentence be added to last paragraph of Section (c) of this rule, as follows: *Cars built after September 1, 1909, will not be accepted from owner after January 1, 1928, with brake beams hung from any portion of car body.*

Reason—To conform to requirements of the A. R. A. Manual of Standard and Recommended Practice, Section E, Page 12.

The committee recommends that the effective date of next to last paragraph of Section (e) be extended to January 1, 1928, as recommended by the Committee on Tank Cars.

The committee recommends a new last paragraph to Section (e) of this rule, as follows:

Proposed Form: After January 1, 1928, tank cars having wooden shims between the longitudinal anchorage and underframe will not be accepted in interchange.

Reason—As authorized by letter ballot on the 1925 report of the Committee on Tank Cars.

The committee recommends that the effective date of the second sentence of Section (1) be extended to January 1, 1928. The present situation justifies this extension.

The committee recommends the addition of a new sentence to the note under Section (o) of this rule, to be effective August 1, 1926, as follows: *Cast-iron wheels of single plate design, conforming to A. R. A. Specifications, marked "A. R. A. X." (the application of a limited number of which has been authorized), will be accepted in interchange.*

Reason—In order to permit of service tests of this design of wheel.

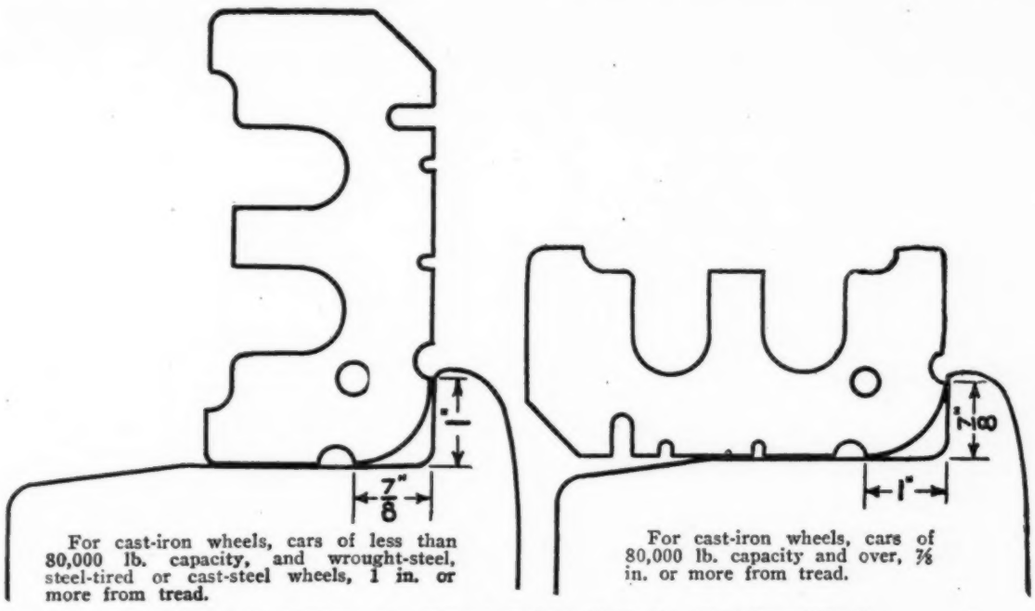
The committee recommends that the effective date of Section (r) of this rule be extended to January 1, 1928. The present situation justifies this extension.

Rule 4

The committee recommends that the first paragraph of this rule be modified, as follows:

Proposed Form: In the case of damage to a car by unfair usage, the handling line must, at the first available inspection point, attach defect card to cover. If car is in shop and a portion only of the unfair usage damage is repaired, defect card must be applied before car leaves the shop. If a car is offered in interchange with delivering line defects, the receiving line shall enquire that a defect card be securely attached to the car, as per Rule 14.

Reason—It is felt this requirement will improve the situation at interchange points.



For cast-iron wheels, cars of less than 80,000 lb. capacity, and wrought-steel, steel-tired or cast-steel wheels, 1 in. or more from tread.

For cast-iron wheels, cars of 80,000 lb. capacity and over, 7/16 in. or more from tread.

Method of Using the Wheel Defect Gage for Cast-Iron Wheels

Rule 7

The committee recommends that first paragraph of Section 3 of this rule be modified, as follows:

Proposed Form: All items carrying labor charges must be covered in proper detail on the original record; the time or money charges (as per Rule 107 and 111) need not be shown. For items of labor computed on the rivet basis, the number and diameter of rivets, *and purpose for which used,* must be shown on original record. For items of labor for straightening or repairing, computed upon weight basis, the weight of material must be shown on original record.

Reason—To enable car owner to properly check repair bills.

Rule 9

The committee recommends that a new item be added to this rule, as follows:

Proposed Form: Journal boxes, periodic repacking, etc.—Length of journal; name of road and date of last previous repacking, "no date" or "date illegible"; work performed, per Rule 66.

Reason—Account change in Rule 66.

Rule 17

The committee recommends that the last phrase of Section (d) of this rule be restated as follows:

Proposed Form: and charge for coupler confined to secondhand value.

Reason—To clarify the intent of the rule.

RULE 19

The committee recommends the addition of a new item to this rule, as follows:

"Cast-iron or malleable iron journal wedges, on journals 10 in. long or over."

Reason—To conform to requirements of A. R. A. Manual of Standard and Recommended Practice.

RULE 23

The committee recommends that a new paragraph be added to Section III of this rule, as follows:

"The building up of worn surfaces on car wheels is prohibited."

Reason—As authorized by letter ballot.

RULE 25

The committee recommends a new third paragraph to this rule, to be effective August 1, 1926, as follows:

"Single plate cast-iron wheels, marked "A. R. A. X.", may be mated with A. R. A. Standard design double plate cast-iron wheels when of same nominal weight."

Reason—In order to permit of service tests of this design of wheel.

RULE 32

The committee recommends that a new second paragraph be added to this rule, as follows:

"Combination outlet valve and plug missing from tank car where car is stencilled that it is so equipped."

Reason—It is felt this item should be protected in interchange.

RULE 33

The committee recommends the addition of a new sentence to the fifth paragraph of this rule, as follows:

Proposed Form: In the event, however, that running board bracket is 8 in. or more in width, splice plate may be omitted and running board bolted direct to bracket.

Reason—To clarify intent of the rule.

RULE 66

The committee recommends that this rule be modified, as follows:

Proposed Form: (Owners responsible.) *(a) Periodic repacking of journal boxes, after the expiration of twelve months, as indicated by the stenciling on car, regardless of the responsibility of handling company for change of wheels or other repairs.*

(b) All journal boxes shall be jacked; all journal wedges and bearings removed for examination, and renewed where necessary; all boxes cleaned and repacked with properly prepared packing (new or renovated) in accordance with A. R. A. recommended practice, and car stenciled. Dust guards shall be renewed, when necessary, only where wheels or journal boxes are changed.

(c) The date and place (railroad and station) where *this* work is done *shall* be stenciled on car body near the body bolster at diagonal corners *with not less than* 1-in. figures and letters, using the same station initial *as* is used for air-brake stencil. *This provision also applies to new cars.*

(d) No change *shall* be made in the stenciling unless all boxes are repacked *and the work complete, in all details, has been performed.*

(e) If car bears no stenciling showing date of previous repacking, all boxes may, if necessary, be repacked in accordance with paragraphs (b) and (c).

(f) This work shall be done only when cars are on repair track for other repairs.

(g) No charge shall be made for repacking, etc., if performed within twelve months from date stenciled on car.

(h) No charge shall be made for repacking, etc., unless all boxes are repacked and the work complete, in all details, has been performed.

(i) Work performed, in accordance with the foregoing, to be charged to car owner at prices specified in Rule 101.

(j) Journal bearings having back or lug broken or cracked, or length reduced ⅛ in. or more, or lining loose, cracked, broken, spread over side or worn through to brass, shall be considered as requiring renewal.

(k) Journal bearing wedges cracked, broken, or top radius worn flat lengthwise of wedge, shall be considered as requiring renewal. Care must be taken to see that wedges are not scrapped account worn unless top radius is actually worn flat.

(l) The periodic repacking, etc., does not contemplate any change in the ordinary attention as to oiling and packing when necessary.

The A. R. A. recommended practice, as mentioned in paragraph (b), is as follows:

[The recommended practice for the packing journal boxes as adopted in 1920 is included in the report in detail.—Editor.]

Reason—It is felt that the proposed rule will effect a general improvement in the situation with respect to hot boxes.

RULE 70

The committee recommends that the first two paragraphs of this rule be modified, as follows:

Proposed Form: Cars stenciled "wrought-steel wheels" *or "1-W wrought-steel wheels,"* if found with cast-iron, cast-steel or steel-tired wheels. *Cars stenciled "wrought-steel wheels" or "1-W wrought-steel wheels," for one end of car only, if such end of car is found with one or both pair cast-iron, cast-steel or steel-tired wheels.*

Cars stenciled "cast-steel wheels," if found with cast-iron or steel-tired wheels. *Cars stenciled "cast-steel wheels," for one end of car only, if such end of car is found with one or both pair cast-iron, steel tired or 1-W wrought-steel wheels.*

The committee also recommends a new interpretation under this rule, as follows:

Q.—Does this rule apply where car has been incompletely equipped, as indicated by the stenciling, with wrought-steel wheels, 1-W wrought-steel wheels or cast-steel wheels?

A.—The intent of the rule is that delivering line will be responsible, in interchange, only in cases where one truck or entire car is so equipped, as indicated by the stenciling. Therefore, if either end of car has been incompletely equipped, as indicated by stenciling for particular location, the responsibility, in interchange, will be confined to such end (or truck) as was completely equipped and car so stenciled.

RULE 71

The committee recommends that this rule be modified to eliminate the word *cracks* and substitute the word *serviceability* instead of the word *safety.*

RULE 74

The committee recommends that an additional cut be shown on page 90 (Fig. 4) to show the method of gaging vertical flanges on cast-iron wheels, cars of 80,000 lb. capacity and over, as illustrated.

Reason—For the benefit of the car inspectors.

RULE 75

The committee recommends that second paragraph of Rule 71 be made new Rule 75 and modified as follows:

Proposed Form: Brake burn: Wheels having defective treads on account of cracks or *combiness* due to heating.

Reason—As recommended by the Committee on Wheels.

RULE 81

The committee recommends that Fig. 8 on page 99 and the note at the bottom of page 100 reading "For wheels cast after January 1, 1908," be eliminated on account of obsolescence.

Reason—As recommended by the Committee on Wheels.

RULE 82

The committee recommends a new rule, to be effective August 1, 1926, as follows:

Proposed Form: Wheels condemnable by the remount gage shown on page 98 (Fig. 7) must not be applied to foreign cars. This gage must not be used for condemning wheels under cars.

Reason—To protect car owner against the application of wheels condemnable by the remount gage.

RULE 108

The committee recommends that last paragraph of this rule be modified, as follows:

Proposed Form: No charge to be made for the material or labor of lubrication, *except as provided in Rule 66.*

Reason—Account revision of Rule 66.

RULE 112

A recommendation from the American Petroleum Institute to provide an alternate method for depreciation under this rule in cases of tank cars with underframes and tanks constructed at different dates and so stenciled, was not concurred in for the following reason:

The Interchange Rules now provide for settlement for cars

destroyed on a uniform basis of reproduction cost for the entire car, depreciated from the date originally built.

The application of a new tank to an old underframe, or vice versa, is a repair or maintenance expense and should be considered in the same light as the renewal or rebuilding of the superstructure of a house car or the application of a new steel underframe, in repairs, to a house or gondola car.

In the case of such repairs or renewals of parts of a house or gondola car, the committee, after careful consideration, decided that it was undesirable and impracticable to provide for different depreciation periods on the underframe and the superstructure, and feels that the same principle should apply in consideration of the tank car.

Rule 120

The committee recommends that the repair limits for labor under Section (b) of this rule, be revised.

[The prices recommended by the committee have a decided downward trend.—Editor.]

Reason—It is felt that these downward revisions are justified in order to afford the car owner an opportunity to decide the question of disposition to be made of the car.

The committee recommends that new sentence be added to the first paragraph of Section (f) of this rule, as follows:

"Wooden longitudinal sills may, at the option of the repairing line, be spliced as per provisions of Rule 22."

Reason—Rule 22 provides for splicing of sills and, therefore, repairing road should not be obligated to carry in stock full length wooden sills for repairs to foreign cars.

Passenger Car Rules of Interchange

Rule 7

The committee recommends the addition of a new Section (i) to this rule, as follows:

"Cars not equipped with safety valves, Type E-7, or equivalent restricted for service cylinder pressure of 60 lb."

Reason—As recommended by the Committee on Brakes and Brake Equipment.

Rule 9

The committee recommends that the first sentence of Section (e) of this rule be modified, as follows:

Proposed Form: Illuminating oils, water and ice, *drinking cups, toilet paper, toilet soap and towels* are not a line expense.

Reason—To clarify the intent of the rule.

Rule 15

The committee recommends that new sentence be added to Section (c) of this rule, as follows:

Proposed Form: Similarly, to justify bill, steam or signal hose applied to foreign cars must be new and made in accordance with A. R. A. Specifications.

Reason—It is felt that new hose should be used in repairs to foreign cars.

This report is signed by T. W. Demarest (chairman), general superintendent motive power, Pennsylvania; J. E. O'Brien, vice-chairman, chief motive power and equipment, Seaboard Air Line; F. W. Brazier, assistant to general superintendent rolling stock, New York Central; W. H. Fetner, chief mechanical officer, Missouri Pacific; J. J. Hennessey, assistant master car builder, Chicago, Milwaukee & St. Paul; J. Coleman, general superintendent car equipment, Canadian National; H. L. Shipman, general car foreman, Atchison, Topeka & Santa Fe; G. F. Laughlin, general superintendent, Armour Car Lines, and Thos. Beaghen, Jr., Mexican Petroleum Corporation.

Discussion

In presenting the report the chairman said that the committee had further considered Rule 70 and recommended that the first two paragraphs be reviesd to provide for each pair of wheels, making the proposed form read as follows:

"Cars stenciled 'wrought-steel wheels' *or '1-W wrought-steel wheels,'* if found with cast-iron, cast-steel or steel-tired wheels. *Cars stenciled for one or more pairs 'wrought-steel wheels' or '1-W wrought-steel wheels' at designated locations, if found with cast-iron, cast-steel or steel-tired wheels at such locations.*

"Cars stenciled 'cast-steel wheels,' if found with cast-iron or steel-tired wheels. *Cars stenciled for one or more pairs 'cast-steel wheels' at designated locations, if found with cast-iron, steel-tired or 1-W wrought-steel wheels at such locations."*

This is to afford protection to the car owner in the application of wheel betterments.

He also said that the committee wished to withdraw the new interpretation under this rule as recommended in the printed report.

T. W. Demarest (Penna.): The committee feels that the 1926 rules generally have been so satisfactory that no material change in those rules is necessary, therefore, few changes except those that have been duly authorized by the association, through their Manual of Standards and Recommended Practice, have been proposed.

R. L. Kleine (Penna.): Proposed new Rule 66, in connection with the prices, provides for a charge of $3.90 for the repacking of journal boxes and the examination of the journal bearings and the journal wedges. I doubt whether we should pass this rule without further consideration. We formerly had a similar rule and on account of the many charges that were made and the work not properly done, the rule was eliminated.

I do not see just how this particular rule is going to improve the condition of hot boxes appreciably, as the rule provides for the examination of the journal box packing, wedges and bearings only on a repair track, and that will only take in such cars as reach the repair track. Furthermore, there are no specifications providing for the kind of packing that must be used, or the condition of the reclaimed oil. Some roads may use woolen packing, others cotton packing, others a combination of wool and cotton and fibre, and just because a car is not stencilled or out of date for stencilling, this charge will be assessed against the owning road. Furthermore, in connection with the renewal of the journal bearings, wedges, etc., it will be made on the prices in the interchange rules and that will assess a pretty heavy charge against the road. The specification should be very closely drawn if such a rule is desired, so that these abnormal charges will not come to the car owner. It would be my idea that Rule 66 be withdrawn from the report of the Arbitration Committee, and a special committee appointed to go into the matter thoroughly to see what can be done to improve the lubrication of freight car journal boxes.

J. J. Tatum (B. & O.): I cannot help but concur in the views of Mr. Kleine regarding this rule. I feel that importance of getting car equipment in good condition but has the committee laid down the rule in sufficient detail to insure this being accomplished as desired?

G. E. Smart (C. N.); I agree with the remarks of the two former speakers. It is practically impossible to repack all the cars in the manner this rule calls for on your repair tracks. I understand we have over two million cars in this country and a large number of these cars are new. They do not necessitate going to the repair tracks in 12 months and I agree there that we should have this rule modified.

I. S. Downing (Big Four): It makes no difference whether this work is done every 12 months, 6 months or 6 years, but you have to take this 12 per cent of dirt out of the waste that you get in there if it has been there one year. The committee may want to change their recommendation, but we have got to get away from trusting to the inspectors as to whether you are going to give free oil or shove a little piece of dope along the side of the journal.

T. J. O'Donnell (Buffalo, N. Y.): I am speaking as a chief interchange inspector, not having a vote for the individual railroads. First of all, our association, comprising about 350 representative terminal men in Chicago,

last September recommended that this rule be reinstated. We did it conscientiously, for the welfare of the railroads that we worked for, feeling that it would expedite the movement of freight. Speaking for the Niagara frontier district, we interchange 11,000 cars every 24 hours. Sixty-eight per cent of them are loads, mostly fast freight traveling to the seaboard. You give the shippers the right to place the limit of load in your car according to the safety and the condition of your metal and the superstructure. For the past 6 months we have been obliged to cut out 4 per cent of all those loaded cars, for cut journals; four journals out of every 100 cars. Ordinarily, you will find them cut either at the fillet or near the collar and blackened in the center. It is due to 55 or 60-m. p. h. speed, the excessive load and the inferior condition of packing.

We feel that the railroads will do most of this within one year, at their own expense. Cars usually come home at least once every 12 months and you can do this work to protect your equipment on your home line. The amount of work that is done against you and charged under this rule would not be a large percentage. We made this recommendation in the firm hope that you gentlemen would adopt it. We feel that cutting out cars every 150 miles is a bad idea.

Mr. Tatum: I want to endorse the statement made by Mr. Downing. I want to endorse the statement made by the gentleman representing the chief interchange inspectors. But in doing so I want to qualify my position. I said in the first place, if you remember, that the rule is all right if it has a specification of work to be done and material to be used. I am 100 per cent in accord with the Arbitration Committee when that is done.

Now, Mr. Downing says that experts don't know whether a car journal box has sufficient oil or not. Suppose we agree with him. But I would like to ask Mr. Downing what kind of waste is the best waste to pack journal boxes with? What kind of oil will be satisfactory to justify the charge for doing this kind of work? That is the point at issue.

Mr. Kleine: I do not think that anyone is objecting to the periodical repacking of journal boxes, which is the rule today. The proposed rule only provides for the repacking when the car is on the shop track, or a foreign car that is on your line. I do not see how this particular rule is going to improve the general situation because you cannot repack a car under the rule unless you place the car on the shop track. I think the subject is a large enough subject to have a very thorough investigation.

Mr. Shipman (A. T. & S. F.): He objects to the shop track being specified. The reason that was done was because when the rule was in effect before, a great many jobs were done with a brush in places that had not proper facilities for packing boxes and stencilling them, and not doing the job right.

We all know that the condition is before us and we all know that the condition must be remedied.

A number of roads have made tests, and if this work is done properly within the one-year limit, they find that they usually get away from the conditions which will cause a burned-up journal. Of course, waste grabs and some other things occur, but the general condition is that we improve our journal boxes materially if they are inspected and repacked every twelve months.

Mr. O'Donnell: About seven per cent or about 800 cars of our total interchange go to the shop track every 24 hours. The opportunity of doing the work there is apparent to you.

C. G. Juneau (C. M. & St. P.): I believe I have some little inkling of the thought that your committee had in mind in drafting this particular rule. I believe that we should have some sort of rule, and I can't help but believe that we must have proper specifications to follow so that the work which is so general will be uniform. We should have uniform dope houses all over the country in order to handle the work properly. We will have to have stills for taking care of the renovating of the oil. We ought to use standard packing also. I think that the rule as drafted by the committee is going to have a moral effect on all of us and make us give better attention to our own equipment, and then the general condition will be improved.

John Dickson (S. P. & S.): We run our freight trains very fast and it requires that the packing in the boxes be in good condition. I am in favor of the 12-month rule. We tried other methods, but I do not think that they are practical, for the reason that the oil is practically wasted in a good many cases. Inspectors will not pay much attention to how much they put in. The back of the box is low, the oil runs out on the wheel, and you have not much effect from it.

At Portland, Oregon, where I am located, we were unloading a great many cars, and we make it a point that when these cars are to be reloaded that we take care of the packing because we know that when they go back over our lines they are going to run like a passenger train.

Mr. Demarest: About six weeks ago I was reading a report from one of the railway companies. It told me just why hot boxes occur, and it told me how they are stopping them. This is about the hundredth report of this kind that I have read, and to me it simply meant this: I do not want a committee because I had all of these reports. I ought to have been well educated. But I ought to go back home and do something, and that something was not to send a committee to find out why these things occur, but to get down to brass tacks and do some work. Your Arbitration Committee is trying constructively to present something to you which will bring about an improvement in your road operations, your operating expenses. The day for talking is past, the day for doing the work is here, and what we want is results.

Chairman Wallis: A motion has been made and seconded that the subject, Rule 66, be given further consideration and a special committee appointed to consider the subject and report to the 1927 Convention.

F. H. Harding (N. Y. C.): The motion is delaying unnecessarily for at least another 12 months a matter which everyone in this room admits is one of the most important questions facing railroad operators today. It is surprising, at least to me, to see the opposition which comes from an attempt to start in a direction which we all admit is desirable. The recommendation has been made by a committee which I believe this association considers is without an equal among all the committees of the association, as to its knowledge, as to its ability, and as to its conservatism. The rule which they have proposed is not one of hasty consideration. It is one which they have had before them for some time. The argument has been made that we had a rule and it was withdrawn. The question was asked: Why was it withdrawn if it was a good rule, and why is it proposed to renew it? The two rules, as I understand it, are not in any way comparable. I will agree with Mr. Tatum that the old rule was not a good one, and it was withdrawn. It required nothing except periodical repacking of the boxes. It told you nothing as to how it should be done, and it was surrounded with no safeguards whatever. The rule was therefore abused. The committee, therefore, has tried to surround this rule with proper safeguards. They have required that this should be a repair track job. They have required that before you can render charges you should jack the box and remove the brass and the wedge. The statement has been made that this will result in considerable expense to the owners of the cars. If the wedge and the brass need to be renewed, I do not be-

lieve anyone would want to say that they would not care to be charged for it. If we can get our cars properly packed for the charge of $3.90 every 12 months, it will be one of the best investments we can possibly make.

I am unalterably opposed to the appointment of a special committee. In the first place, I do not believe it will be possible to appoint a committee with more judgment, more discretion, or more ability on the subject than the committee that has made this recommendation.

There are ways and means in the association for correcting a rule if it is not just right, and for rescinding it if it is all wrong.

Chairman Wallis: There is a motion before the house. Unless there is something further I will put that motion.

(The motion was acted upon and lost.)

Mr. Kline: Inasmuch as Rule 66 takes in the standards and recommended practices, I make a motion that this question be submitted to letter ballot and that will give al the roads an opportunity to pass upon it.

The motion was seconded and after a lengthy discussion, involving principally questions of legality and points of order, the motion was acted upon and lost.

G. E. Tiley (Gen'l Chem. Co.): There is one point in which the private car owners are very much interested. In Rule 112, the Arbitration Committee classifies the substitution of an entire underframe or an entirely new tank on a tank car as maintenance expense. I doubt if any railroad classifies the renewal of an entire body of a car, in rebuilding, possibly to an entirely different design, as a maintenance expense. Certainly, a large number of tank car companies could not absorb such renewals as a maintenance expense and they do not. To state a specific example. In the chemical industry, your tank will not last half as long, in many cases, as the underframe and the trucks for the reason that the tank is constantly subject to corrosion. At the present time, the General Chemical Company has on its tracks 67 cars that require new steel tanks. And it seems decidedly unfair that in the case of a car destroyed on a railroad that we should be required to accept reimbursement on the basis of depreciation going back to original construction of the car; possibly to 1910.

In the present instances we accumulate cars with defective tanks until such time as the equipment is required and then have a lot of 50 or 60 tanks built and applied.

Fortunately, we have few cars which are destroyed on the railroad, but when we do have them, we think it is decidedly unfair for the association to require that a tank built in the year 1926, meeting all the latest specifications, shall be depreciated back to the year 1910 in the event that an entire car is destroyed. The same holds good with the underframe. In other words, we subdivide our equipment into tank, underframe and truck. So far as known, we have not renewed any trucks because constant maintenance keeps truks up to standard. We have had cases where it was necessary to install a complete new underframe for the same reasons that we renewed complete tanks.

In all cases where renewal of the underframe was necessary, we did not replace the underframe with an identical underframe that was originally under the car, but we put under that car an underframe up to date in every respect. I might state that the capital accounts carry distinctive values for tank, underframe and truck, the underframe including the air brake. We should like to go on record as asking for a basis of depreciation which will take into consideration the dates on which the tank or the underframe is actually constructed, eliminating entirely any rebuilding of it. But where it is entirely renewed, I would like to ask for a modification of rule No. 112.

Mr. Demarest: I think Mr. Tiley will recall a meeting requested by the American Petroleum Association with the Arbitration Committee to discuss some changes in the rules of the American Petroleum Association desired. This same question that Mr. Tiley has raised was raised by the American Petroleum Association at that meeting. The matter was discussed thoroughly and my recollection is that the request was withdrawn voluntarily by the American Petroleum Association. I submit that under that situation neither the Arbitration Committee nor this body can take any action on Mr. Tiley's recommendation.

A. E. Smith (Union Tank Car Line): When the American Petroleum Institute met the Arbitration Committee to raise the question as to why we should not get separate depreciation on a tank and underframe when they were built on separate dates, there were very few cars involved at that time and while we did not withdraw the request, we were led to believe that there would be no change in the rule on account of this box car superstructure not being covered by separate depreciation. I don't see any reason why we could not have a separate depreciation of our tank.

Twenty years ago or more, we used to settle for destroyed cars on that basis. That is, we had a separate depreciation on a tank, body and trucks, and, as far as I know, we never had any question arise. We had very few cars in our line. I think somewhere around three thousand, where we have different dates, that is, different dates built, tank, body and truck, and it is not a matter of very great moment to us. But a number of companies are vitally interested, and I think it would be a fair proposition to have a separate depreciation as it would not involve any great question.

(*A motion to adopt the report as read was made and carried.*)

Report on Prices for Labor and Materials

A. E. Calkins
Chairman

It has been found, after an investigation for the past several months with the co-operation of the purchasing agents of representative railroads, that the cost of 25 important freight car material items has decreased 0.4 per cent as compared with the costs shown in the existing Code of Rules effective January 1, 1926. Labor and material prices will be investigated again in October, and if sufficient changes are noted, the committee plans to make another revision to be inserted in the rules effective January 1, 1927. An important feature in this year's report is the proposed change in Item 427 of Rule 107, the purpose of which is to insure uniformity of charges for the cost of welding parts by the oxy-acetylene or electrical process and, where necessary, the annealing incidental to this work. The welding charges as recommended by the committee are to be based on the thickness of the part welded instead of on a flat charge of $1.00 per man—hour plus material costs which is now in effect.

With a view of incorporating necessary changes in the Supplement to be effective August 1, your committee has been investigating costs of materials, labor and new equipment for several months.

Purchasing agents of representative roads furnished quotations as of March 1 on all principal freight car materials, analysis of which indicates that costs of 25 important items such as forgings, gray iron, malleable and steel castings, couplers, bolts, nuts, journal bearings, wheels, axles, springs, brake shoes, pipe, plate and structural steel decreased .4 per cent as compared with

costs shown in the existing Code of Rules effective January 1, 1926. Because of this slight change and having in mind the interests of those handling the details of interchange billing, the committee is confining its recommended changes in Rule 101 to a few specific items which have been the subject of controversy.

While the prices of multiple-wear wrought-steel wheels for freight equipment remained practically the same, we are recommending an increase in the service metal cost per 1/32 in., reversing our recommendation which became effective January 1, 1926, when 35/16 in. maximum service metal was adopted as a divisor in lieu of the 39/16 in. normal figure theretofore used. On recommendation of the Wheel Committee and Technical Committee of the wrought steel wheel manufacturers, we are proposing the use of 31/16 in. (in Rule 98) as the proper divisor for freight car wrought-steel wheels and 27/16 in. for those under passenger cars in the determination of service metal charges and credits.

The inclusion in Rule 101 of tables showing weights of materials formerly incorporated in Circular D.V.-226, plus other necessary data, seems to have met with the approval of the billing clerks.

In new Items 169E to 169I, inclusive, of Rule 101, we have recommended prices for periodical jacking and repacking of journal boxes, to be effective January 1, 1927, with the new Rule 66 proposed by the Arbitration Committee.

Investigation indicates that no change is warranted at this time in labor allowances per hour, as set forth in Rule 101, Item 172 and Rule 107, Items 442 and 443.

An important change is recommended in Item 427 of Rule 107 in order to insure uniformity of charges for the cost of welding parts by the oxy-acetylene or electrical process and, where necessary, the annealing incidental to this work.

We are recommending that the 25 cents allowance (Item 440) for rivets 5/8 in. or over in diameter be reduced to 20 cents. It is known that the tremendous increase in steel car repair work throughout the country, and the consequential improvement in facilities and tools for the performance of such work, has resulted in reducing the labor and overhead cost to representative roads to a point justifying the 20 cents allowance on rivets of these sizes.

We are submitting for your approval reductions in the labor allowances for end and side planks and stakes, inside lining and sheathing on double sheathed house cars, single and double board roofing and miscellaneous short bolts, including certain car parts secured by same. Investigation has shown that the reduced prices now recommended will compensate representative roads handling such repairs.

The costs of new equipment as set forth in Rule 112 for the first six months of any year are necessarily those of the second year preceding because of fact that data are only collected annually and four months are required for tabulation.

Therefore, your committee has recommended complete revision of Rule 112 for the August 1 supplement in line with the changes occurring in the 1925 new equipment market as compared with 1924. Refrigerator and tank car prices are based on figures furnished by representative roads and private lines. Prices for all other equipment represent the average selling prices set up by the Presidents' Conference Committee which has secured quotations on total output of three of the large car manufacturers in the country.

To insure uniformity in the charges rendered for pipe and fittings on passenger cars, important additions are recommended in Items 37 to 37-N of Passenger Rule 22.

It is the intent of the committee to investigate labor and material costs again in October, and if sufficient change develops, necessary revision will be made and inserted in the rules effective January 1, 1927.

Changes Recommended in the Interchange Rules

Rule No. 101

Under Friction and Draft Gears, the committee submits the following revisions of the note:

Proposed form: Note—The prices shown below are to be charged for various friction draft gears applied new complete, when necessary to apply account of any or all parts of old gear being defective. In conformity with Rule 88, one type of gear may be substituted for another if the type substituted conforms to the one removed as to sill spacing and coupler pocket limits, and defect card should be issued for labor of correcting wrong repairs when such substitution is made. In such substitution, *or in the substitution of a new or secondhand complete gear for the same type of gear,* complete gears removed shall be credited at 25 per cent of price new, complete, when removed on account of defective friction casing or defective casing and one or more parts other than casing; and at 50 per cent of price new, complete, when removed on account of any part or parts other than casing being defective.

Secondhand complete friction draft gears *(those containing one or more secondhand parts)* shall be charged at 75 per cent of price new, complete.

When new or secondhand parts of any type of friction draft gear are applied in replacement of such parts being defective, same should be charged at the factory prices, as new, plus 15 per cent. *However, in no case, shall the total charge for new or secondhand parts applied exceed 75 per cent of the price of new gears shown below.*

Page 150. Weights of truck spring coils. The word "arch" will be eliminated from last four lines in next rule revision.

The following new items of material are proposed to be added under this rule:

Item No.	MATERIAL	PROPOSED ⅜-In.	½-In.	¾-In.	1-In.	1¼-In.
66	(New Item) Union Tee, ground joint type	32c	34c	37c	52c	80c
67	(New Item) Union Elbows, lip type.	12c	13c	17c	20c	28c
68	(New Item) Union Elbows, ground joint type	20c	22c	30c	39c	59c
139	(Note following) "When parts are *renewed* separately, charge as per Item 137."					
168-A	(New Item) For journals 12-in. long and over				48 lb.	28 lb.
	Journal boxes; periodical jacking and repacking of, including removal and examination of all journal wedges and bearings and stenciling car, job complete in all details as required by Rule 66, per car:					
169-E	With journals 7 in. long and over, but not 8 in				2.85	
169-F	With journals 8 in. long and over, but not 9 in				3.20	
169-G	With journals 9 in. long and over, but not 10 in				3.45	
169-H	With journals 10 in. long and over, but not 11 in				3.90	
169-I	With journals 11 in. long and over				4.35	
194-A	The price for new wrought steel wheels shall be based on scrap value of $3.00 for metal inside the condemning limit, which is ¾ in. from measuring point as shown by A. R. A. Steel Wheel Gage, or its approved equivalent, plus *$1.15* for each 1/32 in. of service metal (on radius of tread) in connection with standard full flange contour. Note.—In no case shall a charge or credit for service metal on 33 in. wrought steel wheel exceed *31/16* in.					

Rule No. 107

Proposed form: Item 427—*Acetylene and electric welding of freight car parts, exclusive of annealing. Charges shall be in accordance with the following tables, which include all necessary welding material, gas or current, and all labor involved in preparing parts for welding. Where annealing is properly performed, as required by Rule 23, this information should be shown on billing repair card and 100 per cent. added to following prices:*

	Oxy-acetylene process	Electric process
Thickness of part welded	Total cost per inch of weld or fraction thereof, labor and material (Complete)	Total cost per inch of weld or fraction thereof, labor and material (Complete)
1/16-in	$0.02	$0.02
3/16-in	.05	.03
1/4-in	.07	.06
5/16-in	.13	.09
1/2-in	.22	.11
5/8-in	.30	.15
3/4-in	.39	.19
7/8-in	.47	.23
1-in	.57	.28

Thickness to be measured through section of part welded and not through reinforced section of weld. Length chargeable to be the length of the fracture after same has been prepared for welding.

(In addition to the new items the committee also recommends eleven changes in labor prices, eight of which are in the form of a decided increase and the remaining three a slight decrease. A few price decreases are also recommended under Rule 112.—Editor.)

Passenger Car Rule No. 22

The committee recommends the inclusion of the following new items of material and price revisions under this rule:

The report is signed by A. E. Calkins (chairman), superintendent rolling stock, New York Central; Ira Everett, chief car inspector, Lehigh Valley; J. K. Watson, materials supervisor,

(Ref. No.) (New Items)	MATERIAL	Present Charge	Present Credit	Proposed Charge	Proposed Credit
54-A	Triple valve body, K_1, K_2 or convertible type, credit for scrap, 8 in. and 10 in.	.....	$0.40	.....	$0.40
37	Pipe, extra heavy wrot, per ft., ⅜ in.	.....	.09	.....	.0025
37-A	Pipe, extra heavy wrot, per ft., ½ in.	.....	.10	.....	.0025
37-B	Pipe, extra heavy wrot, per ft., ¾ in.	.....	.11	.....	.005
37-C	Pipe, extra heavy wrot, per ft., 1 in.	.....	.16	.....	.005
37-D	Pipe, extra heavy wrot, per ft., 1¼ in.	.....	.38	.....	.01
37-E	Pipe, extra heavy wrot, per ft., 2 in.	.....	.41	.....	.015
37-F	Bushings, extra heavy wrot, 2 in.	.....	.06	.....	.....
37-G	Couplings, extra heavy wrot, 2 in.	.....	.20	.....	.....
37-H	Elbows, extra heavy wrot, 2 in.	.....	.20	.....	.....
37-I	Nipples, extra heavy wrot, 2 in.	.....	.23	.....	.....
37-J	Reducing or Street Elbows, extra heavy wrot, 2 in.	.....	.32	.....	.....
37-K	Unions, lip type, extra heavy wrot, 2 in.	.....	.30	.....	.....
37-L	Unions, ground joint type, extra heavy wrot, 2 in.	.....	.81	.....	.....
37-M	Unions Tee, lip type, extra heavy wrot, 2 in.	.....	.64	.....	.....
37-N	NOTE.—Charge other fittings per Rule 101, Items 58 to 65, inclusive, Freight Code.				
(New Item)	(To be inserted top of page 305.) *Note.—When brake beams are applied on account of being defective, the credit for the part removed shall be the same percentage of the applied part as is shown in Rule 101 of the Freight Car Code.*				
46	Wheels, wrought steel, value of service metal, per ⅛ in., 33 in. wheel.	$1.21	$1.21	$1.33	$1.33
47	Wheels, wrought steel, value of service metal, per ⅛ in., 36 in. wheel.	1.65	1.65	1.81	1.81
49	Wheels, steel-tired, average value of service metal, per ⅛ in.	1.65	1.65	1.81	1.81
55	1st Note following: NOTE.—In no case shall a charge or credit for service metal on 33 inch or 36 inch wrought steel wheel exceed *27/16 inches.*				

Atchison, Topeka & Santa Fe; E. H. Weigman, master car builder, Kansas City Southern; T. J. Boring, general foreman, M. C. B. Clearing House, Pennsylvania; H. H. Harvey, general car foreman, Chicago, Burlington & Quincy; H. H. Boyd, assistant chief mechanical engineer, Canadian Pacific; A. E. Smith (vice-president), Union Tank Car Company, and M. R. Esherwood, master car builder, Swift Refrigerator Transportation Company.

(A motion to accept the report as read, was made and carried.)

Report of Safety Appliances Committee

C. E. Chambers (C. R. R. of N. J.): The Committee on Safety Appliances has no written report this year because there was really nothing to write. During the entire year work has been going on at Purdue University in the testing of air brakes, and H. A. Johnson, director of research, is here, and will be able to give you some interesting facts on these tests.

(Mr. Johnson presented the progress report on the investigation in power brakes at Purdue University. Air abstract of that report was published in the *Railway Age* for Feb. 6, 1926, page 377. The following supplement to that report was then read by Mr. Johnson.—Editor)

Progress of the Power Brake Investigation

The testing of the standard type K triple valves is still in progress and will be completed by June 30, 1926. The time taken to test this equipment was longer than anticipated, which was due to a number of things which developed during the conduct of the work.

A number of cycling tests representing grade operation will be made with the type K equipment using the new retaining valves, which are being recommended by the Committee on Brakes and Brake Equipment at this Convention. This retaining valve is the three-position 10 to 20 lb. duplex spring type valve with which the pressure will blow down from a 10-in. cylinder with 8-in. piston travel or a volume of 640 cu. in. from 55 lb. to 25 lb. in 85 to 95 sec. when in high pressure position and will blow down from 45 lb. to 15 lb. in 45 to 55 sec. when in the low pressure position. The retaining valves which were first installed on the test rack are similar to those above mentioned except that they have a blow-down time of approximately 50 sec. for both the high and low pressure positions. A comparison of the results of the cycling tests made with these two types of retaining valves will show the effect of the longer blow-down time in the high pressure position on the average cylinder pressure obtained.

During the conduct of the tests experience has shown the necessity of revision of certain tests, particularly those representing grade conditions and also the need of additional tests to search out the critical points of failure of the equipment. These revisions and additions have been made to the basic schedule of tests and have resulted in the repeating of some tests with the standard type K brake equipment.

The 150 sets of equipment submitted by the Automatic Straight Air Brake Company have been built and are now delivered at Purdue University. Upon the completion of the tests with the standard type K equipment, the new brake system submitted by the Automatic Straight Air Brake Company will be installed on the test rack and run through the schedule of tests.

The new air brake equipments to be submitted by the Westinghouse Air Brake Company have been built and will be shipped during the next few days. These equipments will be delivered at the power brake laboratory before the testing on the Automatic Straight Air Brake devices is started.

In order to reduce the time required to test an equipment on the test rack, the necessary additional locomotive brake devices have been installed so that tests can be made on individual triple valves at the same time that the tests are being conducted on the 50-car train.

Discussion

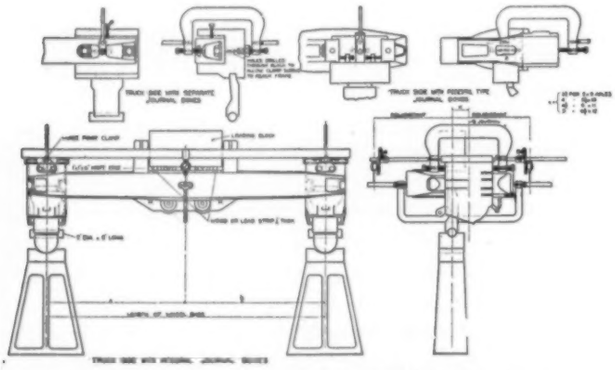
Chairman Wallis: You have heard the report of Mr. Chambers. As it is a progress report, and there is no other subject before the association from this committee, the chair will not ask you to take any action except to receive it, and I presume no motion is necessary.

Report on Specifications and Tests for Materials

F. M. Waring
Chairman

The work of the committee during the past year has included a revision of the lumber specifications which have been referred to the Committee on Car Construction, consideration for possible revision of the specifications for carbon steel castings and air brake hose gaskets; and the preparation of recommended practice specifications for steel sheets and thin plates. The recommendations of the Committee on Car Construction for truck side frames, bolster and coupler yokes, adopted in 1925, have been rearranged in the form of specifications for the Manual. The specifications for carbon steel castings, adopted in 1923, were prepared as the result of joint action with several other committees and with committees from the American Society for Testing Materials. The committee solicits criticisms or suggestions for revision of these specifications from all members interested. The committee, in co-operation with the Committee on Brakes and Brake Equipment, has agreed to retain the present tolerances on air brake hose gaskets.

A revision of the lumber specifications has been prepared and has been forwarded to the secretary for transmission to the Committee on Car Construction since it is understood that this committee is also giving this subject consideration from the standpoint of sizes and grades suitable for car construction. It is hoped that this proposed revision will form a basis for co-operation and result in a final specification which can be reported to the association next year.



Transverse Test Loading of a Truck Side Frame

Specifications for Carbon Steel Castings

These specifications were prepared as a result of joint action by several of your committees and committees from the American Society for Testing Materials. They were adopted in 1923, but for some reason they have not been made use of to as large an extent as would be desirable. A questionnaire was prepared and sent out through the secretary to 25 railroads. The majority of the replies received indicated that the railroads are making use of the specifications as they stand, or have used them as a basis for their own specifications. Not all of the members are satisfied with certain requirements, such as the form in which the physical properties are given, with the minimum tensile strength requirement omitted and yield point used as a criterion for acceptance. There is also some question as to the necessity for specifying an upper limit of 0.85 per cent for manganese in view of the development that has occurred in the use of higher manganese steel for castings with a normalizing treatment. These questions together with some others affecting the form of the specifications are now under consideration and will be acted on during the coming year. The committee solicits criticisms or suggestions for revision of these specifications from all members interested.

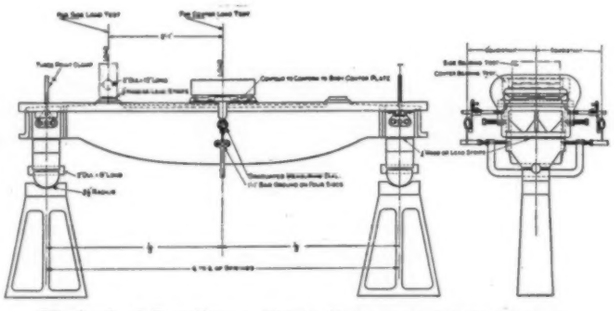
Specifications for Air Brake Hose Gaskets

This committee has been in co-operation with the committee on Brakes and Brake Equipment, and has agreed to retain the present tolerances on air brake hose gaskets. It is understood that the Committee on Brakes and Brake Equipment will prepare a new drawing of the gasket, making certain changes, and after this has been approved your committee will recommend the inclusion of such drawing and a table of the tolerances in the specifications.

Recommendations for Revision of Standard Specifications

Specifications for Helical Springs. Change the last sentence of Par. 7. (c) Free Height, which now reads, "The free height shall not vary more than ⅛ in. from that specified" to read, "*The free height shall not be more than that specified.*" The reason for this change is that it represents a more severe requirement when taken in connection with the change proposed below for Par. 7. (d) Loaded Height.

Par. 7. (d) Loaded Height. Change the last sentence, which now reads "The loaded height shall not vary more than ⅛ in.



Method of Loading a Truck Bolster for Vertical Test

over nor more than $\frac{1}{16}$ in. under that specified" to read, "*The loaded height shall not be less than that specified.*" This change, in connection with the change made in Par. 7 (c) Free Height, is an increase in severity of test requirements with the object of securing springs that have been more carefully made and better heat treated.

Specifications for Coupler Knuckle Pivot Pins: As a result of complaints made by certain manufacturers of pivot pins that the A. R. A. limit gage for round iron required too close a tolerance on diameter, your committee has considered what tolerances might be allowed and finds that since the minimum gage for pin hole in the coupler is $1\frac{1}{4}$ in. this automatically fixes the maximum allowable diameter for the pin; therefore the standard $1\frac{5}{8}$ in. pin may be allowed to vary in diameter from $1\frac{33}{64}$ in. to $1\frac{1}{4}$ in. It is therefore recommended that Sec. 8. Permissible Variations, which now reads "The diameter of the pins shall conform to the standard A. R. A. limit of gages for rounds," be changed to read: "*The diameter of the pin may vary not more than plus or minus $\frac{1}{64}$ in. from that specified.*"

Specifications for Air-Brake and Train Air-Signal Hose; Sec. 15, label, the second sentence of which now reads, "This label shall be applied on the hose at a point 6 in. from the end, etc.," be changed to read, "*This label shall be applied around the hose at a point 6 in. from the end, etc.*"

The use of the word "around" instead of "on" is preferable because of some misunderstanding which has arisen regarding the manner in which the label should be applied, and the change makes this section in agreement with the wording given under the label for air brake hose, Page 15, Section E, of the manual.

Specifications for Annealed and Unannealed Carbon Steel Axles, Shafts and other Forgings: When these specifications were revised in 1925, through an oversight, Section 1, scope, was not reworded so as to clarify the intent of the specifications, and it is recommended that the following changes be made: Change the first sentence of Section 1 (a) which now reads, "These specifications cover two classes of forgings, distinguished, respectively, as 'Medium' and 'Mild,' to read, "*These specifications cover two grades of forgings, distinguished respectively, as 'Medium' and 'Mild,' with the 'Medium' grade divided into Class 'A' for unannealed, and Class 'B' for annealed forgings.*"

Change Section 1 (c) by the omission of the second sentence which reads, "All axles over 6 in. in diameter at center shall be

annealed." This sentence is unnecessary, since the first sentence permits the purchaser to specify annealed or unannealed material, and in the event of the omission of such specification, unannealed material shall be furnished.

Revision of Recommended Practice Specifications

Specifications for Carbon Steel Axles for Cars and Locomotive Tenders: Insert new Par. 9 (c) reading as follows:

"(c) Any straightening of axles, if required, shall be done at a temperature not below 1100° F. (low red), and in such a manner as to leave the surface of the axle free from unnecessary scars."

The reason for this addition is that experience has shown that cold straightening of axles produces a surface deformation which may result in the formation of a detail fracture and consequent failure of the axle.

Specifications for Bronze Bearings for Locomotives: These specifications have been reviewed in co-operation with representatives from the bearing metal manufacturers, and as a result of a joint meeting and discussion have been revised, as shown below, to bring them into line with best current practice.

Sec. 1. Scope, which now reads: "These specifications cover phosphor bronze and soft bronze driving-box shells, rod bushings, rod brasses, shoes and liners for locomotives," to be changed to read: *"These specifications cover rough bronze castings for locomotive wearing parts."*

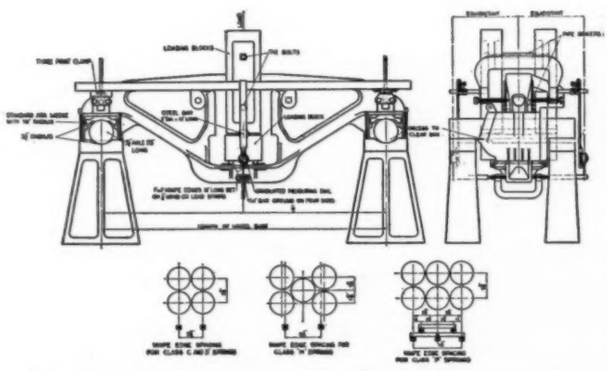
Sec. 2. Chemical Composition, which now reads as follows: "The material shall conform to the following requirements as to chemical composition:

	Phosphor Bronze	Hard Bronze	Medium Bronze	* Soft Bronze
Copper, not over, per cent ..	82	80	77	69
Tin, not less, per cent	8	8	7	4
Phosphorus, per cent	0.4-1.0	0-0.1	0.1-0.25	..
Lead, per cent	8-13	10-15	14-20	26-33
Other elements and impurities, not over, per cent	1	1	1	1

To be revised to read: *"The material shall conform to the following requirements as to chemical composition:*

	Phosphor Bronze	Hard Bronze	Medium Bronze	Soft Bronze
Tin, per cent	9-11	7-10	6-8	4-6
Lead, per cent	8-11	10-15	14-22	23-27
Tin and Lead, not over, per cent	..	22	28	31
Zinc, not over, per cent	0.5	1.25	1.25	0.75
Phosphorus, per cent	0.4-0.8	..	..	..
Other elements, not over, per cent	Incl. Zinc	1	0.75	0.75	0.75
Copper, per cent	Remainder	Rmd.	Rmd.	Remainder

* This grade is frequently used for chilled castings.



Recommended Method for Vertical Test Loading of a Truck Side Frame

Sec. 7. Finish.—Omit the first sentence reading: "All bearing surfaces shall be smooth and free from tool marks." This sentence was inconsistent because the specifications are intended to cover rough castings only.

Specifications for Lined Journal Bearings: These specifications have been reviewed in co-operation with representatives from the bearing metal manufacturers, and as a result of a joint meeting and discussion have been revised, as shown below, to bring them into line with best current practice.

Sec. 3. Composition of back, which now reads:

	Per cent
Lead	16 to 24
Tin	5 to 7
Total of impurities, maximum	4
Copper	67 to 77

Within the ranges permitted, the tin and lead shall vary, if at all, in opposite directions, the tin being increased for the lower percentages of lead.

To be changed to read as follows: *"3. Composition of Back:*

	Per cent
Lead	15 to 22
Tin	5 to 7
Total of impurities, maximum	3
Copper	Remainder

"Within the ranges permitted, the tin and lead shall vary, if at all, in opposite directions, the tin being increased for the lower percentages of lead."

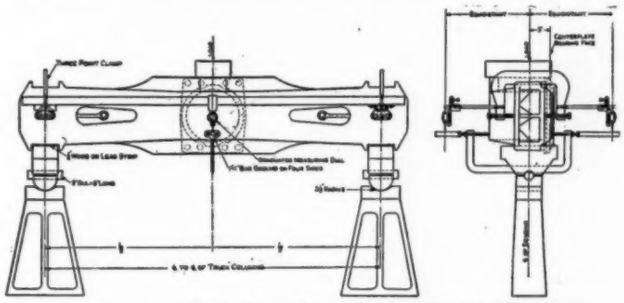
Sec. 4. Composition of lining, which now reads:

	Per cent
Tin	3 to 5
Antimony	8 to 10
Antimony plus tin	12 to 14
Arsenic, maximum	0.2
Total of other impurities, maximum.....	0.5
Lead	85 to 88

To be changed to read as follows: *"4. Composition of lining:*

Tin	As Specified
Antimony, not less than	8.0
Tin and Antimony	10 to 14
Arsenic, maximum	0.2
Copper, maximum	0.5
Total other elements, including copper, maximum	0.75
Lead	Remainder

Sec. 9. Finish, which now reads "All bearing surfaces shall

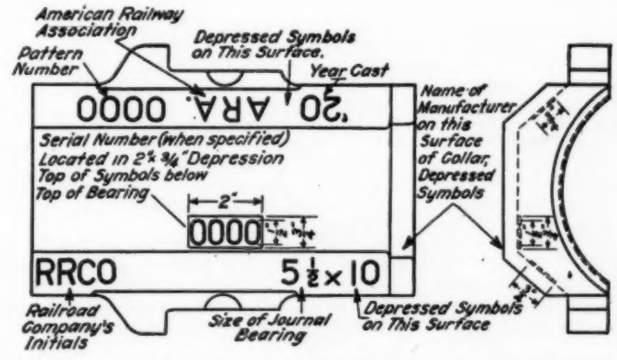


Transverse Test Loading for a Truck Bolster

be smooth and free from tool marks. The castings shall be sound and free from blow-holes, dross, and mechanical defects."

To be changed to read as follows: *"The castings shall be sound and free from blow-holes, dross and mechanical defects. All bearing surfaces, including ends, before and after lining, shall be smooth finished and free from sand."*

Sec. 10. Marking, which now reads "Each lot of 300 or less shall bear a serial number, commencing with 1 at the beginning of the year and continuing consecutively until the end of the year, at each manufacturer's plant. The bearings shall be cast with marks as shown in Fig. 1." To be changed to read as follows: *"The bearings shall be cast with the marks as shown in Fig. 1. When a serial number is specified it shall be located as*


American Railway Association
Pattern Number
Depressed Symbols on This Surface.
Year Cast
Name of Manufacturer on this Surface of Collar, Depressed Symbols
Serial Number (when specified) Located in 2¼ ¾" Depression Top of Symbols below Top of Bearing
2"
RRCO
5½×10
Railroad Company's Initials
Size of Journal Bearing
Depressed Symbols on This Surface

Recommended Method of Marking Journal Brasses

shown in Fig. 1. Each lot of 300 or less shall bear the same serial number, which shall commence with 1 with the opening of the year and continue consecutively until the end of the year, at each manufacturer's plant."

Fig. 1 to be changed as follows: Omit the first two figures from the year. Transfer the letters A. R. A. to the opposite side of the bearing placed midway between the marking for year and pattern number. Class letter "A" to be removed, as there

is now only one class of bearing. Serial number to be designated as optional. In the legend place the words "when specified" after the words "Serial Number."

Specifications for Engine Bolt Iron: Since the A. R. A. limit gages are for round iron only, reference to them in the specification does not fully cover the situation, therefore it is recommended that Sec. 9, Permissible Variations, which now reads "The bars shall conform to the Standard A. R. A. limit gages for round iron," be changed to agree with present commercial practice, which is as follows: *"(a) Round, square and hexagon bars shall not vary more than the limits given in the following table:*

	Variations in Size—In. Under	Over
Up to and including ½ inch	.007	.007
Over ½ inch and including 1 inch	.010	.010
Over 1 inch and including 2 inches	1/64	1/32
Over 2 inches and including 3 inches	1/32	3/64
Over 3 inches and including 5 inches	1/32	3/32
Over 5 inches and including 8 inches	1/16	1/8

"(b) The widths or thickness of flat bars shall not vary more than 2 per cent from that specified."

Specifications for Hollow Staybolt Iron: In view of the trouble which has been experienced in obtaining a full thread on iron which is under the specified size, it is considered desirable to change the tolerances so that the variations in size shall all be over the nominal. Therefore it is recommended that Sec. 11, Permissible Variations, be changed to read, as follows: *"The bars shall be truly round within 0.01 in. The diameter shall not be less than 0.005 in. over or more than 0.020 in. over the specified diameter."*

Specifications for Solid Staybolt Iron: Sec. 10, Permissible Variations, to be revised to read the same as proposed Sec. 11, given above, of Specifications for Hollow Staybolt Iron.

Specifications for Lap-Welded Charcoal Iron Boiler Tubes for Locomotives: In view of the fact that the basis of the specification is that the tube thickness shall not be less than that specified, the provisions in Sec. 13 (d) covering tolerances for tubes which are expanded and swaged are somewhat inconsistent in permitting the thickness of the expanded end to be one gage lighter. However some slight variation is necessary on account of the variations in work of this kind, therefore it is recommended that the same range of tolerances be retained, but that the limits be changed to read as follows: *"In the case of boiler tubes which are expanded and swaged, the thickness of the expanded end may be one-half gage lighter, and of the swaged end four gages heavier than the thickness specified."*

Specifications for Lap-Welded and Seamless Steel Boiler Tubes for Locomotives: Sec. 14 (c), to be revised to read the same as given above.

New Recommended Practice Specifications

The present specifications for structural steel, shapes, plates and bars, cover material which is $\frac{3}{16}$ in. or greater in thickness. There has been a demand for specifications for locomotive, freight and passenger equipment material below $\frac{3}{16}$ in. in thickness. The committee has prepared such a specification which is submitted in Exhibit A.

As a result of the approval of the report of the Committee on Car Construction in 1925, this committee was instructed to take the recommendations therein contained and embody them in the shape of specifications for inclusion in the Manual. The committee has done this without making any change in the recommendations of the Car Construction Committee other than a rearrangement of the subject matter and the addition of loading diagrams to illustrate the method of tests for side frames and bolsters. (The adopted recommendations of the Committee on Car Construction are not included. The loading diagrams referred to are shown.—Editor.)

The report is signed by F. M. Waring (Chairman), Pennsylvania System; C. P. Van Gundy, Baltimore & Ohio; Frank Zeleny, Chicago, Burlington & Quincy; A. H. Fetters, Union Pacific; H. G. Burnham, Northern Pacific; I. C. Ramage, Southern; J. H. Gibboney, Norfolk & Western; F. T. Quinlan, New York, New Haven & Hartford; T. D. Sedwick, Chicago, Rock Island & Pacific; G. N. Prentiss, Chicago, Milwaukee & St. Paul; H. W. Faus, New York Central; H. D. Brown, Chicago & Northwestern, and E. E. Chapman, Atchison, Topeka & Santa Fe.

Exhibit A—Proposed Specifications for Steel Sheets and Thin Plates

1. *Scope.*—These specifications apply to all uncoated steel sheets and plates under 3/16 in. thickness for locomotives, freight and passenger equipment cars. Plates are rolled on a plate mill and are usually rolled to a minimum thickness of .109 in. (12 U.S.S.G.). Sheets are rolled on a jobbing or sheet mill and are usually rolled to a maximum thickness of .187 in. (7 U.S.S.G.), though occasionally to .250 in. (3 U.S.S.G.).

I. Manufacture

2. *Process.*—The steel shall be made by the open-hearth process.

II. Chemical Properties and Tests

3. *Chemical Composition.*—The steel shall conform to the following requirements as to chemical composition.

Phosphorus in material not less than 0.04 in. thick (1.6 lb. per sq. ft.) not over 0.06 per cent.

Phosphorus in material less than 0.04 in. thick (1.6 lb. per sq. ft.) not over 0.10 per cent.

Sulphur, not over 0.06 per cent.

Copper (when so ordered), not under 0.20 per cent.

4. *Ladle Analysis.*—An analysis shall be made by the manufacturer from a test ingot taken during the pouring of each melt to determine the percentage of carbon, manganese, phosphorus, and sulfur, also copper, when copper steel is ordered. Drillings for analysis shall be taken not less than ¼ in. beneath the surface of the test ingot. Upon request, a copy of this analysis shall be given to the purchaser or his representative for all lots ordered not less than 20,000 lbs. of one gage and size. This analysis shall conform to the requirements specified in Section 3.

5. *Check Analysis.*—Check analysis may be made by the purchaser from the bend test specimens. The chemical composition thus determined shall conform to the requirements specified in Section 3.

III. Physical Properties and Tests

6. *Bend Tests.*—The test specimen shall bend cold through 180 deg. flat upon itself without cracking on the outside of the bent portion.

7. *Test Specimens.*—(a) Bend test specimens shall be taken from the finished product.

(b) Bend test specimens shall be taken longitudinally as rolled, and shall be cut from the edge of the sheet or plate midway between middle and end. They may be machined with both edges parallel.

8. *Number of Tests.*—(a) One bend test shall be made from the thickest and thinnest material rolled from each melt, if sheets or plates are ordered in lots of not less than 20,000 lbs. of one gage and size; otherwise, from each lot of 60,000 lbs., or fraction thereof, of each thickness (or weight per sq. ft.).

(b) If the bend test specimen shows defective machining or develops flaws, it may be discarded, and another specimen substituted.

(c) If the bend test specimen fails to meet the physical requirements of these specifications, two retests shall be taken from two other sheets or plates from the same lot, both of which shall meet all the bend test requirements.

IV. Permissible Variations

9. When ordered to weight per square foot, the weight of sheets and plates shall be determined from draft lots. The theoretical weight of sheets and plates ordered by gage number shall be based upon the weights of the United States Standard Gage table. The maximum allowable variation from the theoretical weight shall not exceed the amounts given in Table I.

Table I—Permissible Variation in Weight of Sheets and Plates

Order weight, lb. per sq. ft.	Permissible variation over or under, per cent
2.45 and over	5.0
under 2.45 to and inc. 1.22	3.5
under 1.22	2.5

10. When ordered to thickness, the thickness of each sheet or plate shall not vary more than .01 in. under that order. The overweight of each lot in each shipment shall not exceed the amount given in Table II. The term lot means all of the sheets or plates of each group width and each group thickness. On cubic inch of rolled steel is assumed to weigh .2833 lb.

Table II

Ordered thickness in.	Permissible excess in average weights per sq. ft. of sheets or plates for widths given, expressed in percentages of nominal weights			
	Under 48 in.	48 to 60 in. excl.	60 to 72 in. excl.	72 to 84 in. excl.
Under ¼	9	10	12	14
¼ to 3/16 excl.	8	9	10	12

11. *Size.*—(a) All sheets shall be sheared not less than the widths and lengths ordered.

(b) Sheets ordered 48 in. and less in width shall not exceed the ordered width by more than ¼ in. and for sheets ordered over 48 in. wide, the over width shall not exceed ⅜ in.

(c) The length ordered for sheets 96 in. and less, shall not be exceeded by more than ¼ in. For each 24 in. over 96 in. length, and additional ¼ in. shall be permitted to a maximum of 1½ in.

(d) On full cold rolled sheets, there shall be permitted excess length of not more than 2 in.

(e) Sheets required of accurate size shall be ordered "Resquared," and such sheets shall not be in excess of ordered width and length by more than 1/16 in. if not more than 48 in. wide and 120 in. long, and ⅛ in. for wider or longer sheets.

(f) All plates shall be sheared not more than ¼ in. less than the widths and lengths ordered.

12. *Flatness.*—(a) sheets not ordered "Patent Leveled" and plates shall have the following tolerances for height of buckles:

Gage range, In. Less than	Not less than	Width range, In. More than	Not more than	Maximum Height of buckle,* in.
			48	⅝
	.123 (5.00 lb.)	48	60	¾
		60		1
			48	¾
.123 (5.00 lb.)	.061 (2.50 lb.)	48	60	1
		60		1¼
			36	¾
.061 (2.50 lb.)		36	48	1
		48		1¼

(*) Height of buckle refers to maximum rise from a flat surface on which sheet or plate lies.

(b) Sheets ordered "Patent Leveled" shall not have buckles exceeding ¼ in. in height. Sheets shall not be ordered patent leveled when under .03 in. thick (1.22 lb. per sq. ft.).

V. FINISH

13. *Finish.*—The finished material shall be free from injurious defects and shall have a workmanlike finish.

14. *Marking.*—(a) Sheets shall be properly marked for identification and in accordance with instructions on the purchaser's order.

(b) The name or brand of the manufacturer and the melt number shall be legibly marked on all finished plates.

(c) The melt number shall be legibly stamped on each test specimen that is taken from material that is identified according to melts.

15. *Inspection.*—(a) The inspector representing the purchaser shall have free entry at all times, while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector free of charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture, prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

(b) The purchaser may make the tests and inspection to govern the acceptance or rejection of the material in his own laboratory or elsewhere. Such tests and inspection shall be made at the expense of the purchaser.

16. *Rejection.*—Material which shows injurious defects, subsequent to its acceptance at the manufacturer's works, will be rejected and the manufacturer shall be notified.

17. *Rehearing.*—Samples tested in accordance with this specification, which represent rejected material, shall be preserved for 14 days from date of test report.

Discussion

Mr. Waring: Since this report was put in print, the committee has given consideration to a change in form of expressing the mechanical requirements in both the bronze specifications and lined journal bearings and will submit that changed form to the Secretary immediately after this meeting. No change has been made in the substance of the specification as presented in the report.

The recommendations of the committee are offered to you through letter ballot with the inclusion of this proposed change in the form of expressing the chemical requirements in the specifications for bronzes and for lined journal bearings.

C. H. Bilty (C. M. & St. P.): The revisions of the standard specifications provide for better material in the case of helical springs, axles and locomotive brasses, and also clarify and make more definite the requirements, particularly as to tolerances for other products.

The new specification for steel sheets and thin plates is one we have found to cover a satisfactory material. As to the specification for carbon steel castings while it may be eminently satisfactory to the designer of cars and locomotives, yet it omits points that we consider important, among them being the limit of carbon content and the tensile strength. While the physical requirements do limit the carbon to a certain extent, yet the strength and ductility are modified by the heat treatment so that steel with a carbon content outside of reasonable quantities may pass inspection, particularly where the tensile strength is not specified. Moreover the yield point is not determined with as clear cut results as the tensile strength and in view of late investigations, does not have as direct a bearing on the quality, it being shown that the resistance to fatigue is greater with the higher tensile and is in a more direct ratio with it than with the yield point or elastic limit. Further, it may be stated that one authority has collected about 20 varying definitions for the latter, so it appears that the term is somewhat indefinite. Lastly, it is more difficult for an inspector who is not operating the testing machine to observe the point of beam drop than to see when the bar is broken. We feel that in the specifications for steel castings these points should be considered.

In connection with tolerances allowed for air brake hose gaskets, one of the committee has called attention to a report at the Air Brake Association bringing out that couplings varied from requirements in various dimensions from 41 per cent to 86 per cent of the different lots inspected. It is evident that until this condition is corrected, tolerances as to gaskets is rather of minor importance.

It has been suggested that the new paragraph proposed (9c) for insertion in the specifications of carbon steel axles for cars and locomotive tenders be modified by adding the words "the heat for straightening shall not be higher than that at which same were annealed, and the cooling after straightening shall be the same as for annealing treatment previously given (no quenching or throwing of water on same allowed)." This modification it would seem is unnecessary, and does not apply, as axles purchased under this specification are not annealed.

In respect to specifications for truck side frames, it has developed that it is possible to fix more severe requirements as to deflection, permanent set and breaking load without increasing the weight or cost of frames. Certain of the leading manufacturers have demonstrated their ability to meet such requirements and assert their willingness to do so.

The survey made by the Rubber Association is illuminating. This developed that there were 301 different constructions specified by 19 railroads for water, air, steam and tank hose. Water hose alone was required in 95 different constructions. If A. R. A. specifications "as is" were actually used by these 19 roads the different constructions would be reduced to 40. If all roads used them the reduction would be greater. The advantages accruing would be a reduction in production costs, selling expenses and prices, insure promptness of delivery, increase quality, and simplify stocks. As a consequence much benefit would be passed on to the consumer. Except in certain instances a similar standardization with similar advantages would be attained with other materials.

It is evident that greater use should be made of the A. R. A. specifications with only such modifications as are absolutely necessary due to special service requirements. The committee is in closer touch with railroad requirements than any other body and is giving very close and careful attention to the questions at issue. This necessitates more work than is generally appreciated. One feature that has been of much value during the past two or three years is the joint conferences with manufacturers' committees. This insures the producers a hearing and eliminates unnecessary requirements that may not be of much importance to the consumer, but may be burdensome to the producer. In many instances it brings about an improvement of material due to the manufacturers obtaining a better and clearer comprehension of the service.

H. H. Lanning (A. T. & S. F.): The transportation industry probably uses a wider variety of materials, and without doubt expends annually larger sums for materials, supplies and equipment, than any other industry in the world. Few American railroads produce any of the materials they use, consequently all of them are heavy buyers of materials. It has often been said that railroad purchases, like the activities of the steel industry, may be considered a true barometer of trade conditions. When the railroads are buying, other industries prosper. When the railroads stop buying, the other industries suffer to a noticeable extent. The very magnitude of the volume of railway purchases, if there were no other features to consider, would demand close study and careful consideration to insure the goods purchased being entirely adaptable to the purposes for which they are bought. If this were not done, the possibilities of enormous economic loss to the country and the world at large are clearly apparent.

Many, if not most of the materials used by railroads are necessarily of highly specialized types or grades that have been developed to suit the peculiar needs of railroad service. Further need for specialization along these

lines is developing all the time. It is therefore absolutely essential that the railroads analyze each change in their material requirements and communicate these requirements to the manufacturers. The proper and business-like manner in which these requirements should be presented to the manufacturers or producers is in the form of material modifications, which afford to each party a definite understanding as to the properties expected of the material to be furnished, together with provisions for the inspection and tests necessary to prove the qualities of the material. The specifications should also cover all technical items on which an understanding is desirable.

Who is there among those who are concerned with the properties and qualities of materials purchased for railroad use that does not recall voluminous correspondence with purchasing agents and others over questions that could have been decided much easier and probably eliminated altogether, if the order for the material had been accompanied by a complete and accurate specification? It requires no great exercise of the imagination to visualize the conditions that would exist in the purchasing departments of the larger railroads if, instead of sending a copy of a printed material specification to each manufacturer or jobber, the requirements to be met in connection with each order had to be explained by correspondence.

The promulgation of material specifications by the railroads places all producers or sellers on an equal footing insofar as a clear understanding of the requirements is concerned. It promotes competition and economy in purchases of material and at the same time insures uniformity of quality and all other properties. The practice of purchasing materials on the basis of manufacturer's reputations, claims, or guarantees, usually places one or more of the manufacturers in a position to monopolize the trade, and leads to high prices, together with irregularities in quality.

We must recognize the fact that some manufacturers have anticipated the needs of the railroads in developing or specializing materials that are adapted to railroad use, thereby gaining a strategic position in the trade, if not an actual monopoly on some particular product. As long as any particular manufacturer maintains a practical monopoly on the production of any particular material, there is, of course, little necessity for a railroad to formulate its own specifications covering that material. However, monopolies of this kind are usually short-lived. Competing manufacturers generally find a way to produce and sell a material that is claimed to be as good or perhaps better, than the original. It may, however, not be so good. Under such conditions, the railroads must determine for themselves exactly which material they will use and what they will expect of it. In doing this they will, of necessity, formulate a specification that will cover the case and this specification should, of course, permit as many of the manufacturers as possible to bid on the material, this for the reason that it is to the railway company's interest to foster competition among producers and sellers. Here again the specification becomes the best means of placing all producers on an equal basis and according to them the fair and impartial treatment to which they are entitled.

The greatest benefits that can accrue to the railroads from the use of material specifications result from the experience and knowledge of the materials that must be gained before the materials can be accurately and properly described in a specification. It is a very easy matter to rely upon the skill, knowledge and judgment of a manufacturer, but the best results can not be accomplished in that way. The manufacturer does not have all of the opportunities and facilities that are necessary to fully determine the requirements of railroad service. His ideas are practically certain to be more or less biased by such matters as quantity production, competitive prices, etc., in which he is, as a rule, more deeply interested. The most efficient and economical use of materials will be achieved only when the railroads determine their own requirements and place them before the manufacturers, compromising with the manufacturers when necessary with respect to items which affect economical production.

In the reports of the committee on Specifications and Tests of Materials, the railroads are receiving the benefit of the knowledge of materials gained by the experience of and tests that have been made on the roads represented by the membership of the committee, also other roads who have coöperated with the committee. We do not always agree with the recommendations of the committee but we have, and expect to exercise, the privilege of calling their attention to matters in which we do not agree with them.

(A motion was made and carried to submit the report to letter ballot.)

Committee on Loading Rules

R. L. Kleine
Chairman

In accordance with what has come to be the accepted practice with the Committee on Loading Rules, the work during the past year was devoted to developing suggested changes in rules which will, first, promote increased safety, and second, enable shippers to handle the loading of difficult commodities with greater ease and dispatch. One of the important results of this work from the railroads' point of view will be increased serviceability secured from car equipment and another the evidence afforded the shippers of the railroads' desire to co-operate in every possible way in increasing the safety and reducing the cost of loading commodities in freight cars. Every effort should be made to impress shippers with the importance of adhering to the Loading Rules, which are recommended by the committee only after the most exacting and careful tests of a large number of experimental loads. Cars loaded in the first place in accordance with the American Railway Association rules will not normally be delayed in transit at a considerable expense of time and labor to have this work properly done.

During the past year your committee as well as sub-committees, have held meetings with shippers, concerning recommendations for changes and additions to the loading rules. Trial shipments embodying new forms of loading were sent out and carefully followed to destination to determine the safety and practicability of such loading.

As a result of their investigations, your committee submits the following recommendations for changes in the rules and cuts for your approval and submission to letter ballot for adoption by the Association.

General Rules for Loading Materials

Rule 14 (b)

Proposed Form: Care must be taken to keep the stakes from spreading at the top while the cars are being loaded, and in

no case must the load exceed the width of car, except where special provision is made in detail rules, *providing that projecting parts of built up machines, tank shells and similar bulky commodities may exceed width of car if such width is within the clearance limits of the roads over which the lading is to pass and does not interfere with the application of the specified bracing or blocking of the load.*

Explanation: This rule is modified to take care of wide machines and bulky commodities, particularly when loaded on flat cars that are narrow over the stack pockets.

Rule 23

It is proposed that the table under this rule be revised to include a schedule of permissible weights for single loads of structural material overhanging both ends of car. These loads at present are governed by Rule 223 which carries a weight limit of 80,000 pounds. The increased weights for this type of load can be handled safely where restriction in height of load is observed.

Rule 24

Proposed reduction of the prescribed 4-in. clearance between lading and floor of car or end gates, on loads of long material

Recommendation: The Loading Rules Committee received from the steel shippers a recommendation for reduction in clearance between lading and floor of car or end gates, from 4 in. to 2 in. where all steel or steel underframe cars are used.

Action: To determine whether this clearance could be safely reduced the committee followed up approximately 110 shipments of long material of a flexible, semi-flexible and rigid nature and checked the actual clearance. This investigation developed that

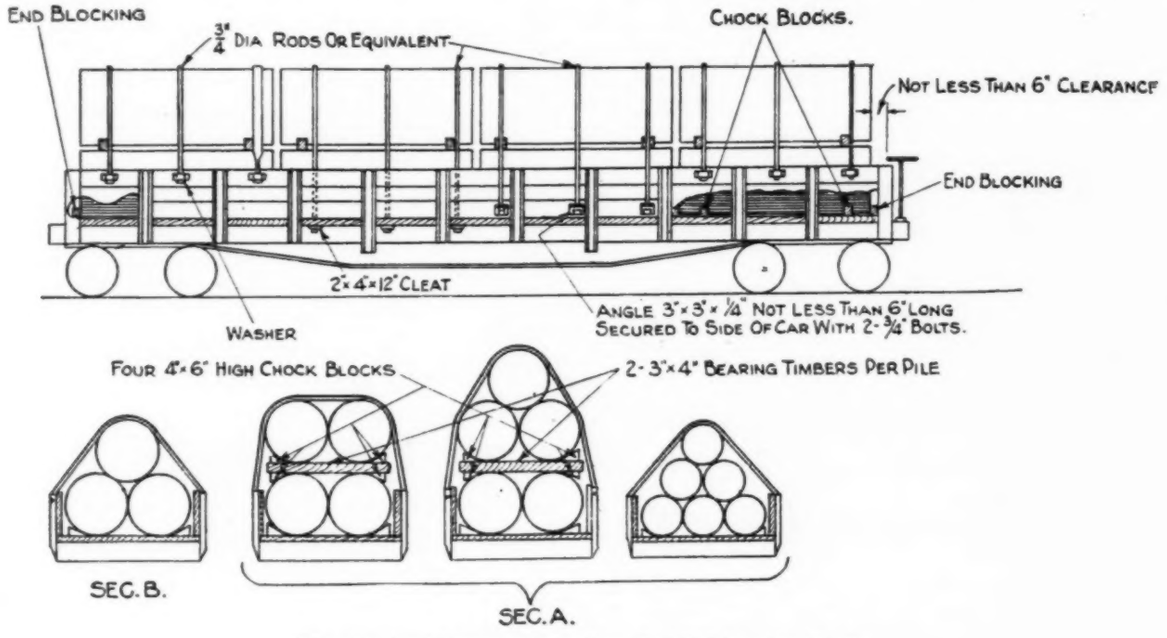
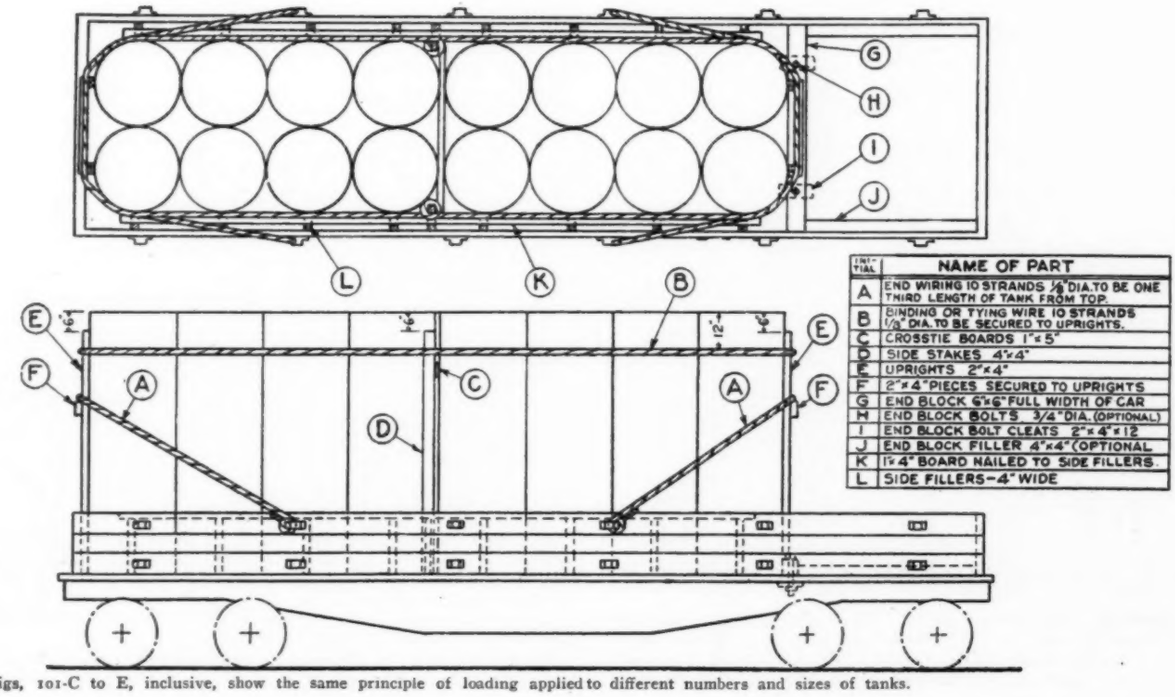

END BLOCKING
3/4" DIA RODS OR EQUIVALENT
CHOCK BLOCKS.
NOT LESS THAN 6" CLEARANCE
END BLOCKING
2"×4"×12" CLEAT
WASHER
ANGLE 3"×3"×1/4" NOT LESS THAN 6" LONG SECURED TO SIDE OF CAR WITH 2-3/4" BOLTS.
FOUR 4"×6" HIGH CHOCK BLOCKS
2-3"×4" BEARING TIMBERS PER PILE
SEC. B.
SEC. A.

Fig. 101-A—Manner of Loading Small Diameter Tanks



INITIAL	NAME OF PART
A	END WIRING 10 STRANDS 1/8" DIA. TO BE ONE THIRD LENGTH OF TANK FROM TOP.
B	BINDING OR TYING WIRE 10 STRANDS 1/8" DIA. TO BE SECURED TO UPRIGHTS.
C	CROSSTIE BOARDS 1"×5"
D	SIDE STAKES 4"×4"
E	UPRIGHTS 2"×4"
F	2"×4" PIECES SECURED TO UPRIGHTS
G	END BLOCK 6"×6" FULL WIDTH OF CAR
H	END BLOCK BOLTS 3/4" DIA. (OPTIONAL)
I	END BLOCK BOLT CLEATS 2"×4"×12
J	END BLOCK FILLER 4"×4" (OPTIONAL
K	1"×4" BOARD NAILED TO SIDE FILLERS.
L	SIDE FILLERS—4" WIDE

Figs, 101-C to E, inclusive, show the same principle of loading applied to different numbers and sizes of tanks.

long loads do not travel very far before there is a permanent loss of clearance due to load sagging and settling on the bearing-pieces. In fact, gages placed on the cars to check the clearance indicated that the 4-in. allowance is used up at times on practically every shipment of long material.

In view of the conditions that were found the committee deemed it unsafe to make any reduction in the prescribed 4-in. clearance between lading and floor of car or end gates and the steel shippers were advised accordingly.

Rule 30

Proposed revision of Rule 30 and the table under this rule. The width of long loads must never exceed the following dimensions for the given distance between bearing-pieces or length of overhang when load does not exceed 12 ft. in height, measured from the top of the rail. (*See Rule 228.*) For loads of greater height, subtract 2 in. from given width (W) of load for every inch of height in excess of 12 ft.

Distance Between Bearing Pieces Six-Tenths of Total Length of Lading

Length of load	Distance between bearing pieces D	Width of load between bearing pieces W	Length of overhang C	Width of overhang W	Clearances necessary for loads in drop end gondola cars
50 ft.	30 ft. 0 in.	9 ft. 6 in.	10 ft. 0 in.	9 ft. 1 in.	13 in.
55 ft.	33 ft. 0 in.	9 ft. 4 in.	11 ft. 0 in.	8 ft. 11 in.	14 in.
60 ft.	36 ft. 0 in.	9 ft. 3 in.	12 ft. 0 in.	8 ft. 8 in.	15 in.
65 ft.	39 ft. 0 in.	9 ft. 2 in.	13 ft. 0 in.	8 ft. 6 in.	16 in.
70 ft.	42 ft. 0 in.	9 ft. 0 in.	14 ft. 0 in.	8 ft. 3 in.	17 in.
75 ft.	45 ft. 0 in.	8 ft. 10 in.	15 ft. 0 in.	8 ft. 0 in.	19 in.
80 ft.	48 ft. 0 in.	8 ft. 8 in.	16 ft. 0 in.	7 ft. 8 in.	20 in.
85 ft.	51 ft. 0 in.	8 ft. 6 in.	17 ft. 0 in.	7 ft. 5 in.	21 in.
90 ft.	54 ft. 0 in.	8 ft. 4 in.	18 ft. 0 in.	7 ft. 2 in.	22 in.
95 ft.	57 ft. 0 in.	8 ft. 2 in.	19 ft. 0 in.	6 ft. 9 in.	23 in.
100 ft.	60 ft. 0 in.	8 ft. 0 in.	20 ft. 0 in.	6 ft. 5 in.	24 in.
105 ft.	63 ft. 0 in.	7 ft. 9 in.	21 ft. 0 in.	6 ft. 1 in.	25 in.
110 ft.	66 ft. 0 in.	7 ft. 7 in.	22 ft. 0 in.	5 ft. 8 in.	26 in.
115 ft.	69 ft. 0 in.	7 ft. 4 in.	23 ft. 0 in.	5 ft. 3 in.	27 in.
120 ft.	72 ft. 0 in.	7 ft. 1 in.	24 ft. 0 in.	4 ft. 10 in.	28 in.

Note: For loads of uniform width throughout length of load the minimum width (W) for distances between bearing pieces (D) and length of overhand (C) applies.

Distance Between Bearing Pieces Seven-Tenths of Total Length of Lading

Length of load	Distance between bearing pieces D	Width of load between bearing pieces W	Length of overhang C	Width of overhang W	Clearances necessary for loads in drop end gondola cars
50 ft.	35 ft. 0 in.	9 ft. 4 in.	7 ft. 6 in.	9 ft. 3 in.	15 in.
55 ft.	38 ft. 6 in.	9 ft. 2 in.	8 ft. 3 in.	9 ft. 1 in.	16 in.
60 ft.	42 ft. 0 in.	9 ft. 0 in.	9 ft. 0 in.	9 ft. 0 in.	17 in.
65 ft.	45 ft. 6 in.	8 ft. 10 in.	9 ft. 9 in.	8 ft. 9 in.	18 in.
70 ft.	49 ft. 0 in.	8 ft. 8 in.	10 ft. 6 in.	8 ft. 7 in.	20 in.
75 ft.	52 ft. 6 in.	8 ft. 5 in.	11 ft. 3 in.	8 ft. 5 in.	21 in.
80 ft.	56 ft. 0 in.	8 ft. 3 in.	12 ft. 0 in.	8 ft. 2 in.	22 in.
85 ft.	59 ft. 6 in.	8 ft. 0 in.	12 ft. 9 in.	7 ft. 11 in.	24 in.
90 ft.	63 ft. 0 in.	7 ft. 9 in.	13 ft. 6 in.	7 ft. 8 in.	25 in.
95 ft.	66 ft. 6 in.	7 ft. 6 in.	14 ft. 3 in.	7 ft. 5 in.	26 in.
100 ft.	70 ft. 0 in.	7 ft. 3 in.	15 ft. 0 in.	7 ft. 2 in.	28 in.
105 ft.	73 ft. 6 in.	7 ft. 0 in.	15 ft. 9 in.	6 ft. 10 in.	29 in.
110 ft.	77 ft. 0 in.	6 ft. 8 in.	16 ft. 6 in.	6 ft. 6 in.	30 in.
115 ft.	80 ft. 7 in.	6 ft. 5 in.	17 ft. 3 in.	6 ft. 3 in.	31 in.
120 ft.	84 ft. 0 in.	6 ft. 1 in.	18 ft. 0 in.	5 ft. 11 in.	33 in.

Note: For loads of uniform width throughout length of load the minimum width (W) for distances between bearing pieces (D) and length of overhand (C) applies

Distance Between Bearing Pieces Eight-Tenths of Total Length of Lading

Length of load	Distance between bearing pieces D	Width of load between bearing pieces W	Length of overhang C	Width of overhang W	Clearances necessary for loads in drop end gondola cars
50 ft.	40 ft. 0 in.	9 ft. 1 in.	5 ft. 0 in.	9 ft. 6 in.	17 in.
55 ft.	44 ft. 0 in.	8 ft. 11 in.	5 ft. 6 in.	9 ft. 4 in.	18 in.
60 ft.	48 ft. 0 in.	8 ft. 8 in.	6 ft. 0 in.	9 ft. 3 in.	20 in.
65 ft.	52 ft. 0 in.	8 ft. 6 in.	6 ft. 6 in.	9 ft. 2 in.	21 in.
70 ft.	56 ft. 0 in.	8 ft. 3 in.	7 ft. 0 in.	9 ft. 0 in.	22 in.
75 ft.	60 ft. 0 in.	8 ft. 0 in.	7 ft. 6 in.	8 ft. 10 in.	24 in.
80 ft.	64 ft. 0 in.	7 ft. 8 in.	8 ft. 0 in.	8 ft. 8 in.	25 in.
85 ft.	68 ft. 0 in.	7 ft. 5 in.	8 ft. 6 in.	8 ft. 6 in.	27 in.
90 ft.	72 ft. 0 in.	7 ft. 2 in.	9 ft. 0 in.	8 ft. 4 in.	28 in.
95 ft.	76 ft. 0 in.	6 ft. 9 in.	9 ft. 6 in.	8 ft. 2 in.	30 in.
100 ft.	80 ft. 0 in.	6 ft. 5 in.	10 ft. 0 in.	8 ft. 0 in.	31 in.
105 ft.	84 ft. 0 in.	6 ft. 1 in.	10 ft. 6 in.	7 ft. 9 in.	33 in.
110 ft.	88 ft. 0 in.	5 ft. 8 in.	11 ft. 0 in.	7 ft. 7 in.	34 in.
115 ft.	92 ft. 0 in.	5 ft. 3 in.	11 ft. 6 in.	7 ft. 4 in.	36 in.
120 ft.	96 ft. 0 in.	4 ft. 10 in.	12 ft. 0 in.	7 ft. 1 in.	37 in.

Note: For loads of uniform width throughout length of load the minimum width (W) for distances between bearing pieces (D) and length of overhang (C) applies.

Explanation: Reference to Rule 228 is added to the text and a new column is added to the table to take care of clearances when gondola cars are used. The revised table provides a graduated clearance dependent on length of load and distance between bearing pieces, whereas the rules now provide only one clearance for all twin loads and one clearance for triple loads.

Group I. Rules Governing the Loading of Logs, Lumber, Ties and Similar Products

Figures 15 and 16: Omit limits for clearance of load at end gates and insert new note referring to table under Rule 30 for clearance.

Explanation: Note changed to conform with proposed addition in table under Rule 30 covering clearances in gondola cars.

Group II. Rules Governing the Loading of Structural Material, Plates, Pipe and Similar Products

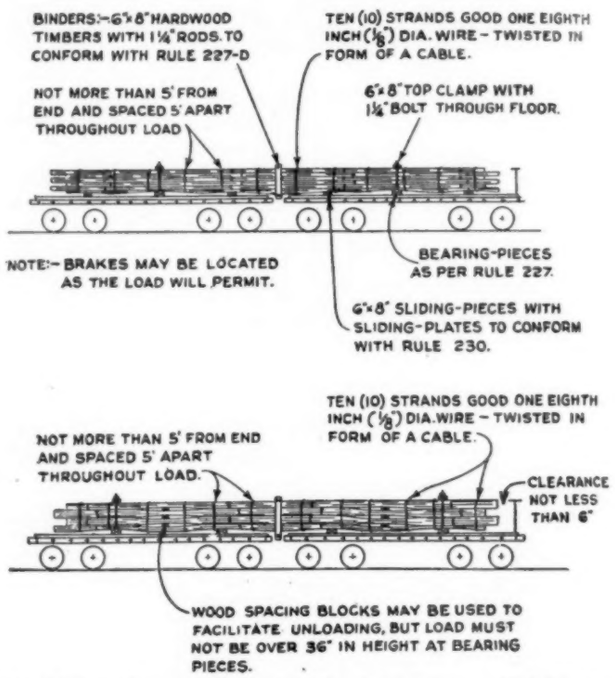

BINDERS:-6"x8" HARDWOOD TIMBERS WITH 1¼" RODS TO CONFORM WITH RULE 227-D
TEN (10) STRANDS GOOD ONE EIGHTH INCH (⅛") DIA. WIRE - TWISTED IN FORM OF A CABLE.
NOT MORE THAN 5' FROM END AND SPACED 5' APART THROUGHOUT LOAD
6"x8" TOP CLAMP WITH 1¼" BOLT THROUGH FLOOR.
NOTE:- BRAKES MAY BE LOCATED AS THE LOAD WILL PERMIT.
BEARING-PIECES AS PER RULE 227.
6"x8" SLIDING-PIECES WITH SLIDING-PLATES TO CONFORM WITH RULE 230.
TEN (10) STRANDS GOOD ONE EIGHTH INCH (⅛") DIA. WIRE - TWISTED IN FORM OF A CABLE.
NOT MORE THAN 5' FROM END AND SPACED 5' APART THROUGHOUT LOAD.
CLEARANCE NOT LESS THAN 6"
WOOD SPACING BLOCKS MAY BE USED TO FACILITATE UNLOADING, BUT LOAD MUST NOT BE OVER 36" IN HEIGHT AT BEARING PIECES.

Fig. 63-A—Alternate Method of Loading Concrete Reinforcing Rods or Similar Flexible Material 24 In. to 36 In. in Height at Bearing Pieces

Rule 223

It is proposed to increase the weight limit in this rule from 80,000 lb. to 90,000 lb.

Explanation: The limit in this rule is increased to conform with minimum carload weights that are in effect and is in line with safety.

Rule 224-A

Proposed Form: Structural material, such as I-bars, columns, plate girders and similar heavy sections may be loaded on single cars with an overhang at each end of car. These loads should be secured in the manner shown in Fig. 53 and the weights indicated in the table under Rule 23 for loads on single cars with overhang at each end will govern for loads on which the distance from top of rail to center of load does not exceed 7 ft. 6 in. Where this height is exceeded Rules 223 and 224 for materials of light construction will govern.

Explanation: A new rule is provided to take care of structural material loaded on single cars with overhang at each end of car. This rule provides increased weight allowances for the heavier types of structural materials where the height of load is relatively low.

Rule 227

Proposed Form: Material loaded on gondola cars with drop ends or on flat cars, as shown in Fig. 62 without sliders, must have one hardwood bearing-piece not less than 10 in. by 10 in. for loads up to 65,000 lb. per bearing-piece, and not less than 12 in. by 12 in. for loads exceeding 65,000 lb. per bearing-piece. (See General Rule 31-A for light loads).

Material loaded on gondola cars with drop ends, or on flat cars, as shown in Fig. 63, with sliders must have one hardwood

bearing-piece not less than 10 in. by 10 in. for loads up to 80,000 lb. per bearing-piece, and not less than 12 in. by 12 in. for loads exceeding 80,000 lb. per bearing-piece. (See General Rule 31-A for light loads).

Explanation: The weight for loads on 10 by 10 in. bearing-pieces has been increased from 65,000 to 80,000 lb. where sliding pieces are used and a portion of the weight rests on the sliders. The present rule does not make any compensation for the weight carried on the sliding pieces.

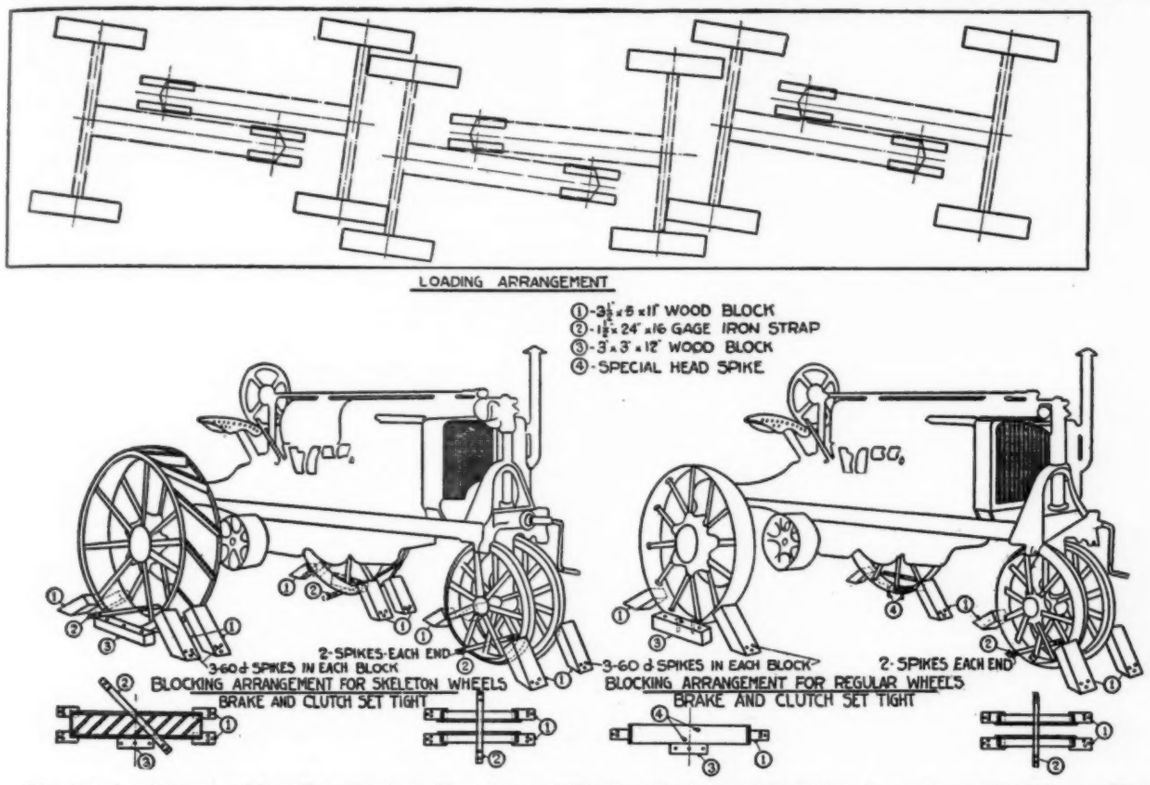

LOADING ARRANGEMENT
①-3½"x8"x11' WOOD BLOCK
②-1½"x24"x16 GAGE IRON STRAP
③-3"x3"x12" WOOD BLOCK
④-SPECIAL HEAD SPIKE
2-SPIKES EACH END
3-60 d SPIKES IN EACH BLOCK
BLOCKING ARRANGEMENT FOR SKELETON WHEELS
BRAKE AND CLUTCH SET TIGHT
3-60 d SPIKES IN EACH BLOCK
2-SPIKES EACH END
BLOCKING ARRANGEMENT FOR REGULAR WHEELS
BRAKE AND CLUTCH SET TIGHT

Fig. 105-A—Manner of Loading Engines, Tractors and Similar Machinery Weighing Less than 8,000 Lb., on Flat Cars

Rule 227-C

Proposed Form: A clamp consisting of hardwood top clamping-piece 6 in. by 8 in. in section and two vertical rods 1¼ in. in diameter placed close to load and passing through clamping-piece, bearing-piece and floor of car, shall be applied at each bearing-piece as shown in Fig. 49. Each end of clamping-piece shall have a ½ in. bolt with suitable washer under head and nut to prevent clamping-piece from splitting. If load is 24 in. in height or over,

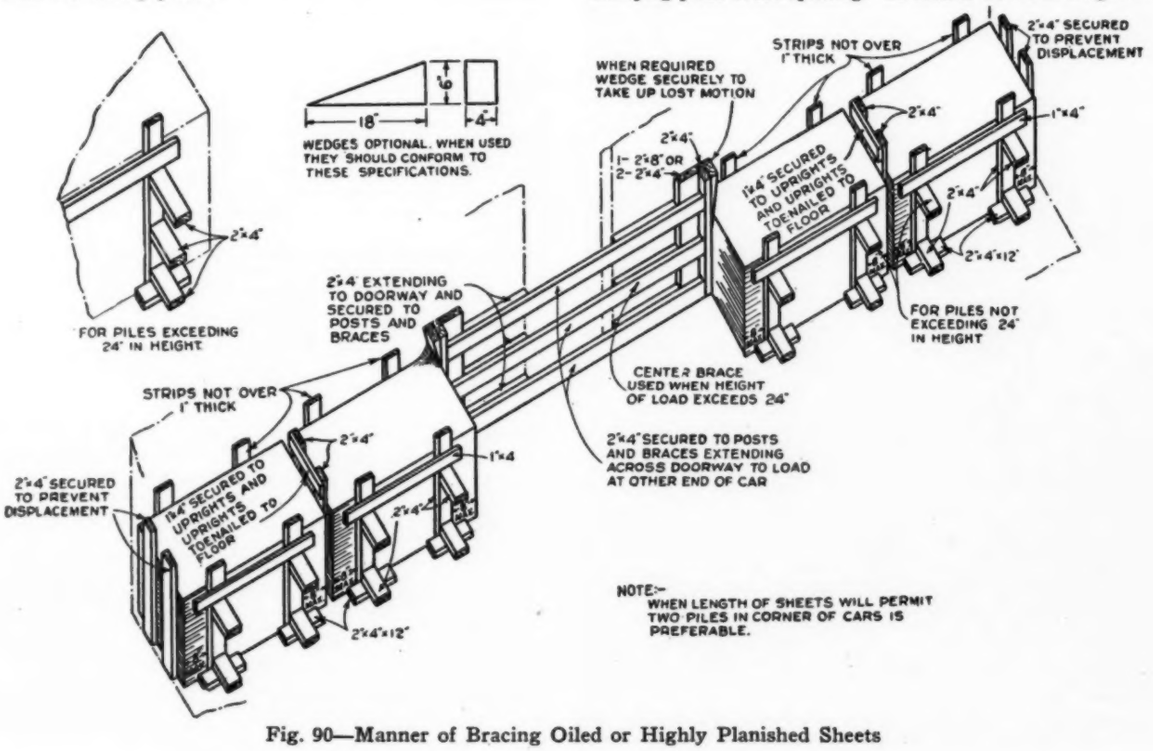

18"
4"
WEDGES OPTIONAL. WHEN USED THEY SHOULD CONFORM TO THESE SPECIFICATIONS.
2"x4"
FOR PILES EXCEEDING 24" IN HEIGHT
2"x4" EXTENDING TO DOORWAY AND SECURED TO POSTS AND BRACES
STRIPS NOT OVER 1" THICK
2"x4"
1"x4"
1"x4" SECURED TO UPRIGHTS AND UPRIGHTS TOENAILED TO FLOOR
2"x4" SECURED TO PREVENT DISPLACEMENT
2"x4"x12"
WHEN REQUIRED WEDGE SECURELY TO TAKE UP LOST MOTION
2"x4"
1- 2"x8" OR 2- 2"x4"
STRIPS NOT OVER 1" THICK
2"x4" SECURED TO PREVENT DISPLACEMENT
1"x4"
2"x4"
1"x4" SECURED TO UPRIGHTS AND UPRIGHTS TOENAILED TO FLOOR
2"x4"
2"x4"x12"
FOR PILES NOT EXCEEDING 24" IN HEIGHT
CENTER BRACE USED WHEN HEIGHT OF LOAD EXCEEDS 24"
2"x4" SECURED TO POSTS AND BRACES EXTENDING ACROSS DOORWAY TO LOAD AT OTHER END OF CAR
NOTE:- WHEN LENGTH OF SHEETS WILL PERMIT TWO PILES IN CORNER OF CARS IS PREFERABLE.

Fig. 90—Manner of Bracing Oiled or Highly Planished Sheets

braces 4 in. by 6 in. for loads up to 5 ft. in height and 6 in. by 8 in. for loads 5 and not over 7 ft. in height, must be added as shown in Fig. 53. The incline of brace should be as great as possible. The clamping-piece at top of load should just clear load when braces are used. *These braces may be omitted from loads of concrete reinforcing rods or similar long flexible material 24 in. to 36 in. in height by substituting wire coils consisting of 10 strands of good ⅛ in. diameter wire, twisted in the form of a cable. These cables must be tightly secured around the entire load and spaced not more than 5 ft. apart, beginning not more than 5 ft. from end of load. Suitable spacing blocks may be used to facilitate unloading, if desired, but load must not exceed 36 in. in height at bearing-pieces. See Fig. 63-A.*

Explanation: An alternate method of loading concrete reinforcing rods and similar flexible material 24 in. to 36 in. in height at bearing-pieces is provided. This method has been tried out and found satisfactory in service.

Rule 228

Proposed Form: When drop end gondola cars are used for twin loads, the minimum clearance at center of load between bearing-pieces, as specified in table under Rule 30, must be provided on each side between the load and car sides and end gate stops at narrowest point. Overhanging portion of loads must be provided with a minimum clearance of one inch for each foot of overhang.

Note 1—Triple loads requiring bearing-pieces located on the floor of the first and third car and the center car acting as an idler must not be loaded in drop end gondola cars.

Note 2—A twin load supported on bearing-pieces on first and second car with overhanging load over third car, either with or without sliding-pieces on third car, should be treated as a twin load for side clearance. The overhang governs the width of load according to tables under General Rule 30.

Explanation: Rule has been rewritten to provide a graduated clearance for twin loads in accordance with revised table under Rule 30 and gondola cars have been eliminated for triple loads on floor of car.

Rule 249, First Paragraph

Proposed Form: There should be not less than three pairs of stakes to each pile, when the material is 23 ft. or less in length *or 3 ft. or less above car sides,* the top of each pair of stakes to be held together by not less than six strands equal to three wrappings of good ⅛ in. diameter wire resting on the pipe, in addition to any intermediate wiring or dunnage strips for character of shipments, as provided for in succeeding paragraphs. Intermediate wiring need not be used when load is 3 ft. or less above car sides. If pipe is more than 23 ft. long *or extends more than 3 ft. above car sides,* there must be at least four pairs of stakes, but where dunnage strips are used between consecutive layers of pipe, three pairs of stakes will be sufficient. Boards, when used to tie stakes together longitudinally with side of car, must be secured to the inside of the stakes and must not under any circumstances be nailed to the outside of the stakes.

Explanation: This rule has been revised to require four pairs of stakes to each pile of pipe when pipe extends more than 3 ft. above top of car sides. The requirement is added to the rule to increase the safety of the load.

Rule 250, First Paragraph

Proposed Form: Gondola cars loaded higher than 3 ft. above top of sides with wrought pipe *less than 24 in.* in diameter should have the stakes pulled together after pipe has been loaded to top of sides by means of a rod with turnbuckles or any other suitable means, until the side stakes are slightly inclined toward center of car. Opposite stakes should then be secured by wire as close to top of car sides as practicable, but not over 18 in. above top of same, and further loading of pipe should be placed on this wire. Top of stakes should again be secured by wire, as provided for in Rule 249. Where facilities do not make it possible to properly apply the intermediate wiring, bearing-pieces (not less than 4 in. wide and 1 in. thick *for pipe 12 in. or less in diameter and not less than 4 in. wide and 2 in. thick for pipe more than 12 in. and less than 24 in. in diameter*) located at the stakes and extending full width of lading should be placed between consecutive courses of pipe. *Where the pipe does not completely fill the space between the stakes,* each course of pipe should be securely blocked on both sides to prevent rolling. (See Figs. 78, 79 and 80).

Explanation: Rule revised to provide for wrought pipe more than 12 in. and less than 24 in. in diameter loaded in gondola cars.

Rule 265

Proposed Form: In order to prevent, as far as possible, shifting of top of piles, and where length of sheets will permit, it is preferable to load two piles at side of car between end and door post. Piles of sheets to be separated by at least two 2-in. by 4-in. uprights suitably spaced and held securely in upright position. See Fig. 90. Where length of sheets will not permit two piles as per Fig. 90 they must be loaded in accordance with Fig. 90-A. The piles must be securely wedged apart, by bracing consisting of two 2-in. by 4-in. uprights against each pile, located not more than 8 in. from the ends and extending not less than 4 in. above top of piles and be securely wedged apart at top and bottom by 2-in. by 4-in. pieces. The bottom of uprights to be secured by 2-in. by 4-in. by 12-in. cleats nailed to unrights and floor of car. Uprights to be tied together at top by 1-in. by 1-in. longitudinal strips. See Figs. 90 and 90-A.

Explanation: The method of bracing oiled or highly planished sheets has been modified to increase the efficiency. Rules 265 and 266 have been rewritten to cover the proposed methods as shown on Figures 90 and 90-A, and to accord with present practice.

Rule 266

Proposed Form: The bracing at ends of piles toward center of car shall consist of one upright piece 2 in. by 4 in. against end of pile, backed up by one upright piece 2 in. by 8 in. or 2 in. by 4 in. pieces against side of car uprights to extend not less than 4 in. above top of pile and be securely nailed to side of car as per Figs. 90 and 90-A. All longitudinal end bracing must be substantially secured to posts and braces and one piece of 2 in. by 4 in. in each brace must extend across doorway, to load at other end of car. See Figs. 90 and 90-A. Where height of load exceeds 24 in. it will be necessary to apply additional longitudinal bracing at center of load as per Figs. 90 and 90-A. Oiled sheets should be placed on suitable strips and heavy paper used to prevent oil stains on floor of car.

Explanation: The method of bracing oiled or highly planished sheets has been modified to increase the efficiency. Rules 265 and 266 have been rewritten to cover the proposed methods as shown on Figures 90 and 90-A, and to accord with present practice.

302-A

Proposed Form: Small diameter tanks when more than one tank can be placed longitudinally (side by side) on flat or on gondola cars shall be loaded three, four, five, six or more tanks per pile as in Fig. 101-A.

Tanks loaded four per pile, also five, six, or more per pile in pyramidal form must be secured by three rods or bands per pile. Tanks loaded three per pile must be secured by two rods or bands.

Rods must be at least ¾ in. in diameter, and bands must be of equivalent strength with suitable provisions to secure to side of car, stake pockets or floor with ¾ in. nuts and washers or cleats; threaded ends to be riveted over or checked to prevent loss of nuts.

Each layer of tanks, when not loaded in pyramidal form must be separated by at least two 3-in. by 4-in. bearing timbers having 4-in. by 6-in. chock blocks spiked to the top and bottom of each bearing timber.

Side blocks on floor when loaded on gondola or flat cars must be 4 in. wide by 6 in. high and applied as shown in Fig. 101-A for each pile of tanks, and when loaded on flat cars each block must be backed up by a 4 in. by 5 in. side stake.

End blocking must be applied at outer end of end piles. On gondola cars, the end blocking should be 4 in. by 4 in. spiked to the floor with sixty-penny spikes, and on flat cars the end blocking should be 4 in. by 6 in. bolted to the floor of car with two ¾ in. bolts with 2-in. by 4-in. by 12-inch. cleats under the floor.

Tanks, when not loaded in pyramidal form must have tanks in the upper layers directly above those in lower layer.

NOTE: Riveted tanks that may be damaged by coming in contact with each other must have filler pieces not less than 1 in. by 4 in. of sufficient length, so placed to protect tanks from damage by rivet heads.

Group III. Rules Governing the Loading of Mining Cars, Engines, Boiler Shells, Machinery and Similar Commodities

Loading of Engines, Tractors and Similar Machinery

General Rules 2, 3, 4, 5, 7, 8-A, 8-B, 10, 12-A, 12-B, 14-A, 14-B and 31-B must be observed in addition to the following detail rules:

Rule 304

Proposed Form: Shipments of engines, *tractors* and similar machinery, *the length of which is greater than the width of the car, weighing over 8,000 lb.,* and loaded on their own wheels,

should have wheels securely chocked fore and aft, and should have longitudinal sills placed on the outside of wheels and securely fastened to floor of car.

Struts should be used to prevent the heavy parts of the engines and similar machinery shifting endwise. One end of the strut should be placed against some strong projection on engine or machinery, the other end being securely fastened to the floor of car. See Figures 102 and 103.

Explanation: Rules 304 and 305 are revised to provide a method of loading lighter machines lengthwise of car. These rules at present cover only the heavier types, specifying heavy blocking, which is not necessary for the light machines.

RULE 305

Proposed Form: Shipment of engines, *tractors* and similar machinery, the length of which is greater than the width of the car, *weighing over 8,000 lb., with the spacing of the front wheels on the outside less than the spacing of the rear wheels,* should be loaded as per Figures 104 and 105. *If the weight is 8,000 lb. or less they may be loaded as per Figs. 105-A, 105-B. or 105-C.* If the length is less than the width of the cars, they should be loaded crosswise of the car, and should be loaded with front and rear alternating so as to equalize the weight on car. Front and rear of tractors should be securely wired to stake pockets with four strands of good ⅛-in. diameter wire, and each wheel should be securely chocked fore and aft and on each side as per Figs. 106 and 106-A.

Explanation: Rules 304 and 305 are revised to provide a method of loading lighter machines lengthwise of car. These rules at present cover only the heavier types, specifying heavy blocking, which is not necessary for the light machines.

This report was signed by R. L. Kleine (chairman), assistant chief of motive power, Pennsylvania System; R. H. Dyer, general car inspector, Norfolk and Western; E. J. Robertson, superintendent car department, Minneapolis, St. Paul and Sault Ste. Marie; Samuel Lynn, master car builder, Pittsburgh and Lake Erie; G. R. Lovejoy, master mechanic, Detroit Terminal; T. O. Sechrist, assistant superintendent machinery, Louisville and Nashville; C. J. Nelson, chief inspector, Chicago Car Interchange Bureau; and R. B. Rasbridge, superintendent car department, Reading.

RULE 320-B

Proposed Form: Tanks having a flat end may be loaded with flat end on floor of gondola cars.

When such loads cover the entire car floor and length of tanks is one and one-half times, or less, the height of the car side above the floor, no securement is required. When the entire floor space is not covered, the lading must be blocked at floor with a 4-in. by 4-in block the full width of the car, backed up with four 4-in. by 4-in. by 10-in. angular chock blocks spiked to the car floor. The top of the load at the end of the car which is not entirely filled, must be secured with not less than six strands of ⅛-in. diameter wire, or its equivalent applied in the manner shown in Fig. 101-B.

When such loads cover the entire car floor and length of tanks is more than one and one-half times, but not more than two and one-half times the height of the car side above the floor, both ends of the load must be protected with at least ten strands of ⅛-in. diameter wire or its equivalent applied in the manner shown in Fig. 101-B.

In all cases when the length of tanks exceeds two and one-half times the height of the car side above the floor they must, in addition to end wiring required, be secured by binding or tying around the load at a point 12 in. from the top of the tanks, with ten strands of ⅛-in. diameter wire or equivalent.

When such loads do not take up the entire floor space, the tanks must be secured as provided in the two preceding paragraphs and in addition they must be blocked at the bottom with a 6-in. by 6-in. block the full width of the car, secured to the car floor with two ¾-in. bolts with 2-in. by 4-in. by 12-in. cleats under the floor or in lieu of bolts, the 6-in. by 6-in. block must be backed up by two 4-in. by 4-in. pieces extending to the end or end gate stops and securely nailed to the car floor.

If tanks do not fill the entire width of the car, they must be centrally placed on floor of the car and the space between tanks and car sides must be blocked out to prevent side motion with filler pieces not less than 4 in. wide which completely fill the space between the tanks and the car sides as shown in Fig. 101-B.

Explanation: The rule covering the loading of small diameter tank has been revised to clarify the meaning and to further provide for tanks loaded on end in gondola cars.

There being no discussion, a motion was made and carried to submit the report to letter ballot.

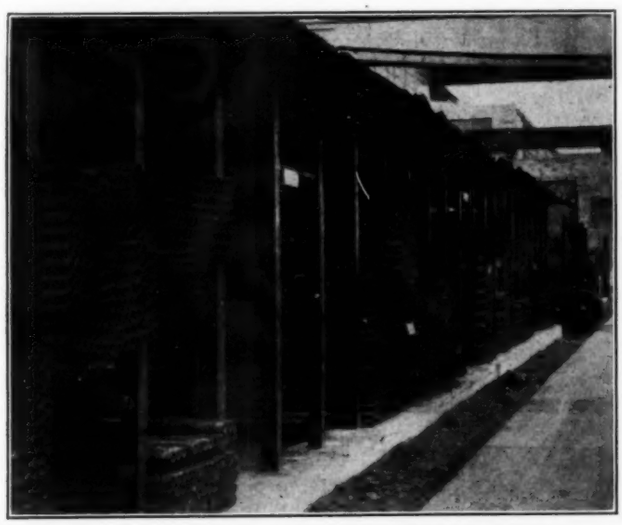
(The session adiourned.)

Registration, American Railway Association

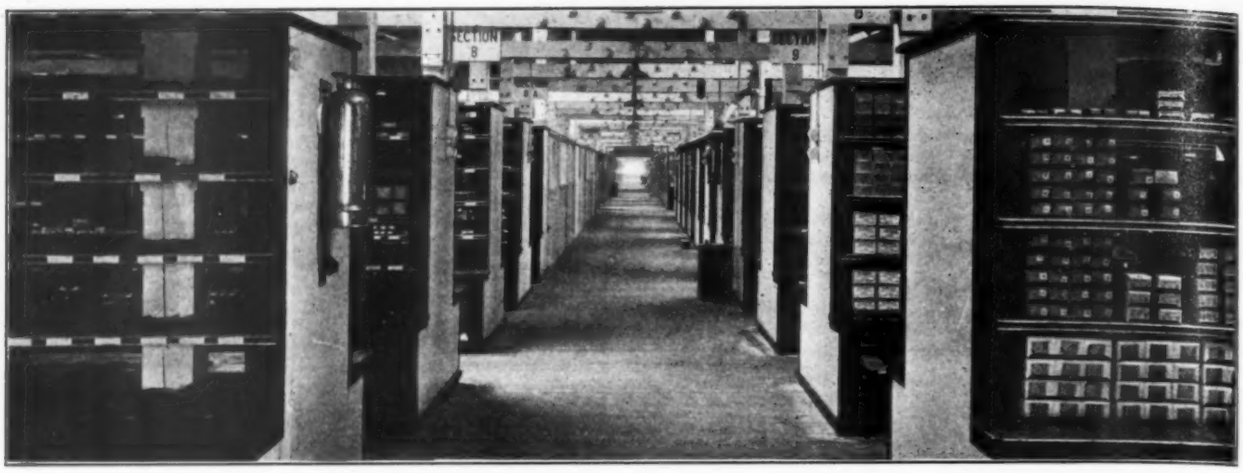
(Continued from Page 1605)

Johnson, C. B., Ch. St. Book Insp., Penna.
Johnson, Jr., Cooper C.
Johnson, T. A., Elec. Eng., C. of Ga., Knickerbocker
Julier, Jos., Knickerbocker
Jung, Theo., For., L. I., Pine Hall
Kaltenbach, H. R., Penna.
Kauffman, Harry, Ambassador
Kaufman, H., Asst. Road For. Engs., P. & R.,
Keighley, Larry
Kelly, Philip M., Research Eng., C. R. R. of N. J., Arlington
King, G. L., Sec. to Ch. Elec. Eng., B. & O., Shelburne
King, H. M., Repairman, Penna.
Kinter, G. G., For., Penna.
Kroesen, F. I., Penna.
Kuehner, A. T., Sp. Eng., F. E. C., Sterling
Kuhn, George, Trav. Auditor, N. Y. N. H. & H., Clarkston
Malone, G. B., Welding Instr., Sou., Dennis
Maurice, C. H., Acct., Rutland, Chalfonte
Macbeth, Albert, S. M. P., W. & L. E., Ambassador
Mechlin, Ernest F., Washington Council, West. R. R. Assn.
McArdle H. A.
McConnell, Fordham B., Elec., Engr., P. & L. E., Haddon Hall
McDowell, J. C., Asst. For., L. I., Elberon
McGee, E. J., Penna.
McHale Edwin F.
McNamara, W. J., Secy to Asst G. M., N. Y. C. & St. L., Ambassador
Mettinger, E. E., Clerk, Penna.
Metzger, W., For. C. R. R. of N. J., Lyric
Moore, S. B., Cons. Engr., Texas Highway Com., Ambassador
Morland, G. B., For., W. J. & S. S.
Moses, Master Winfield, Son of E. R. S., N. Y. C., Pennhurst
Moyer, Edw., For., Penna.
Mozley, Edw., Princess
Murphy, James S., Div. Pass. Agt., Penna.
Noel, F. C., Draftsman, N. & W., Marlborough
Nordquist, N. H., For., Penna., Thurber
Norris, J. C., For. Car Shop
Ossaka, Kenji, M. E., Japanese Govt. Rys., Chelsea
Parker, W. T., Spec. Mach., N. J. & S. S.
Phipps, J. W., Am. Ry. Assn. Insp., B. & O., Bovier
Pratt, L. D., Gen. For. Pass. Car Dept., Penna.
Ralston, Lawrence R., Ritz
Ritter, Gilbert P., Washington Counsel Western R. R. Assn., Chalfonte
Robey, A., Asst. Ch. Cl., Sou., Traymore
Sammond, J. M., Div. Car Insp., N. & W., Ritz
Sarvas, P. D., Cl. Stores Dept., P. & R., Reading Co.
Sayer, William, M. M., K. C. T., Ambassador
Shaw, Albert, Supt., L. & H.
Smith, Chas. E., Fuel Insp., P. & R.
Smith, Milton B., Clk., C. & N. W., Breakers
Sparks, Preston S., Atlantic City
Springer, H. C., Shop Insp., Penna.
Stevens, Frt. Agt., B. & O., Strand
Swartz, P. A.
Sweeny, V. L., Asst. Ch. Cl. to S. M. P., R. F. & P., Knickerbocker
Toomey, T. H., Gen. For., Penna.
Trainer, Oliver, Machinist, L. V., Glaslyn
Wetzel, N. F., Power Plant Eng., C. C. C. & St. L., Marlborough
Whitesel, F. R., Shop Acc., R. F. & P., Craig Hall
Widrick, F. A.
Willingham, C. A., Shop For., Interstate, New England
Wilson, T. A., Sterling
Wilson, T. A., Dist. Car For., N. Y. C. & St. L., Sterling

* * *



Flue Stocks are Carried in Racks Beneath a Travelling Crane at the Denver, Colo., Store on the Burlington



Storekeeping on the Southern Pacific at Sacramento, Cal.

Purchasing and Stores Officers Hold Second Session of Annual Meeting

Variations in accounting practices arouse keen interest—Motion pictures given.

THE second day's session of the seventh annual convention of Division VI—Purchases and Stores—American Railway Association, began at 9:00 a.m., on Thursday. The meeting was distinguished by an address by Elisha Lee, vice president in charge of operation, Pennsylvania Railroad, and also by the quality of certain of the reports and papers presented; notably a paper by U. K. Hall, general supervisor of stores, Union Pacific, on the determination of the cost of carrying material; and committee reports on the methods of accounting of materials and supplies by railroads, and on the methods of purchasing equipment. These subjects which aroused animated discussion, were supplemented by reports of committees or special papers on stationery and printing, standardization and simplification of store stock, reclamation and stores facilities. Interest in Thursday's meeting was further enlarged upon by the presentation of stereopticon slides and motion pictures in connection with the reports on declamation and scrap handling and on stores facilities.

The address of Mr. Lee, who placed the purchasing and stores officers in the category of trustees of the properties they serve, is presented below, together with the remarks of other speakers and the reports of committees.

The Scientific Aspects of Purchase and Stores Work

By Elisha Lee

Vice President Operation Pennsylvania System

Elisha Lee

Since receiving the invitation which brought me here today, I have looked into the history of Division VI. I was surprised and interested in finding that it is a continuation in another form of the Railway Storekeepers Association, organized in Chicago 22 years ago by representatives of 50 railroads. Some of these men, I understand, who took part in the early activities of that organization and furnished the inspiration for the development and achievements of later years, are attending this convention and to those men I want to offer my sincere congratulations and thanks.

The pioneers in a successful movement must have not only the vision to plan but the energy and determination to accomplish in the face of opposition. How well these pioneers planned and worked in preparing the way for Division VI is a matter of record with which you are familiar. It should be an inspiration to you in carrying on your work as representatives of corporations seeking the most effective ways of serving the public.

Purchase and Stores Never More Important

At no time in the history of railroads have executive officers generally attached more importance to the purchase, storing and distribution of materials than at present. There is always in the mind of the executive the necessity for solving that most difficult problem of balance between investment and service, a problem that is

made difficult by the magnitude of the operation of the modern railroad. The details of the solution of that problem lie with you. It is obvious that an unnecessarily large investment in material to protect an operation is just as wasteful as an unnecessarily large amount of metal in a bridge. It is not difficult to construct a bridge if unlimited quantities of metal are used but it requires vision and talent of a high order to design a bridge with just enough metal to carry the load safely throughout the life of the structure.

Purchase and distribution are intelligently performed only when coordinated with the purposes of the department needing the material. Therefore, it is essential that you make an effort to learn the plans and purposes of those departments. On the other hand it is your right to insist that the problems of purchase and procurement be understood by those departments. It is this exchange of views that produce the team work essential for net results. We are all engaged in performing a public service and must keep that fact constantly in mind and while we must endeavor to conduct the business so that it will earn a profit on the investment, we should not lose sight of our obligation to produce for the public the best service that human energy and intelligence can develop.

Supply Officers are Trustees

You are trustees for a very large and important operation. The results of your actions are often not immediately apparent, in fact the success of your work usually depends upon the accuracy of your forecasts made many months in advance. The temptation is usually to provide an over stock in the hope that errors of judgement on that side of the ledger may remain concealed. But I want to urge upon you, in the interest of the development of the art, that facts be faced courageously and that errors of judgement, when they occur, be used as examples for correcting practices that may need correction. It is only by such method that your work can be placed on the substantial basis of a science which I believe you recognize is a desirable objective.

Overstocks, by reason of their carrying charges, ultimately affect net income adversely just as certainly as payroll wastes, and as trustees your responsibilities for overstocks are unquestionally only second to those of providing adequate service.

Statistics show that the prosperity of the country is closely allied to the buying policies of the railroads. In recent years an effort has been made to minimize the wide fluctuations in commercial activity with a view to keeping employment and output more nearly uniform. There still are waves of activity and no doubt those waves will continue to some extent, but you can assist in minimizing them. The orders you originate and act upon reflect the composite mental attitude of the officers of the railroad, and may or may not represent accurately the real needs of the railroad. It is unfortunate, but true, that our desires frequently affect our judgment in these cases. If you have built up and maintained records of past performances you will find them surprisingly useful as guides for controlling the waves of ordering hysteria which you frequently meet, and afterward in supporting your action. Nothing is so convincing to the operating officer as the record of what he has actually done before under similar circumstances.

If those waves are not controlled before the orders reach the manufacturer, he must increase his organization to handle the peak load until the wave of orders passes and unless pressure is intelligently applied the wave gathers momentum as it progresses. The duty undoubtedly is yours to exert that intelligent pressure, not always directly, perhaps, but if not directly then through the presentation of facts to officers in such a way that they may exert the pressure.

Treat Supply Interests Fairly

While the purchasing departments are directly charged with the responsibility of buying material, and the stores departments with the responsibility of the custody and distribution of that material, there is a larger responsibility that falls upon you because of your contacts with the manufacturer and seller of material and that is to demonstrate to them by word and act that the railroads as a whole are making an honest endeavor to transact their business ably, fairly and impartially. You are dealing with a class of men who rank with the highest in our country's commercial activities today, who represent industries that are equipped with talent and capital to develop the country's resources and who themselves are quick to recognize fair dealing. While the railroads have achieved remarkable results in improved performance, we have not yet reached the point where we cannot learn much from outside sources. If you are not able to do all that a manufacturer or seller desires, make sure, before he leaves you, that he does not feel he has been unfairly treated.

In looking over your proceedings of former years I was impressed with the variety of subjects considered and I have been equally impressed with the magnitude of the purchases, aggregating nearly one and one-half billion dollars, necessary to supply the railroads of this country. But little appears in the proceedings about possible methods of controlling the cost of purchasing, storing and distributing this vast amount of material. In these days of intensive action on the part of railroads to produce economies in operating costs, I want to commend to your attention the obligation that rests upon us to examine our procurement, storage and distribution methods and costs most thoroughly, to investigate the effect of installing labor saving devices and to look for short cuts which may eliminate unnecessary road and office operations. I do not know that any figures are available showing the cost of the operations I have referred to but it is certainly not less than $80,000,000 per year for all railroads a sum well worth your serious consideration.

It is a pleasure to have had this opportunity of meeting the purchasing and stores officers of our great American railroads. You are here to consider and decide upon the best methods of fulfilling a trusteeship of large proportions and responsibilities and as railroad officers with high conceptions of your calling, I am ready to predict that you will reach those decisions in the same clear-cut, forceful way in which you have met and overcome the difficulties that have been encountered since the war. There is no better evidence of the confidence placed in you than the magnitude of the responsibilities which you are now bearing.

The Cost of Carrying Materials

By U. K. Hall

General Supervisor of Stores, Union Pacific System

U. K. Hall
Chairman

Never in the history of railroading has there been as much attention given to the question of material investment as at the present time. Especially does this apply to the higher executives, as they are becoming more and more interested in this phase of the situation.

There is still, however, a task ahead, one that will require deep thought, study, research and a campaign of education, to overcome. This task consists of getting the operating officials and the actual users of material to realize how the railroads are being penalized by carrying overstocks.

It is a self-evident fact to any one who has made a study of the problem, that irrespective of the common belief it is costing the railroads large sums yearly to carry excess materials. Naturally such cost eventually finds its way into the operating expenses; hence the operating officials and users generally are vitally affected.

The loss from over-investment is one of the hidden losses that is difficult to prove, hard to see, and therefore more dangerous than one that is self-evident.

Irrespective of accounting methods and our inability to compare results, none of us are entirely satisfied with what has been accomplished in stock control, nor do we feel that better results could not be accomplished through more diligent study and research. We all agree that excess stocks bring about increased costs.

When we know that every dollar of the company's money tied up in material investment brings with it such a carrying charge, we should see to it that this investment is reduced to the lowest consistent minimum in order to reduce this carrying charge. There are certain items that enter into these costs which cannot be evaded, for example—

Interest on investment	Insurance
Handling charge	Storage facilities
Obsolescence	Wastage
Deterioration	Depreciation
Accounting	etc., etc.
Taxes	

When, however, we come to a discussion of just what these items actually consist of, and attempt to show the proportion or the per cent that each bears to the whole, a difficult task is faced.

Analyses Open To Criticism

It is realized that at the present time any analysis of this subject is open to criticism and will bring forth but questionable results at the best; however, in order to bring the matter to cause if possible, greater study of the subject, an attempt will be made to analyze the approximate costs. The consensus of opinion of experts, who have studied this subject, has been that it costs from 15 to 25 per cent to carry materials.

A report of a joint New England Railroad Committee to the Governors of the New England states, dated June, 1923, delving into the railroad situation generally, contains the following:

"It is the opinion of experts on railroad supplies that excessive supplies cost on the average at least 15-per cent a year, made up of interest, deterioration, obsolescence, storage facilities, taxes, insurance, extra handling and accounting."

In an address delivered at the 37th annual meeting of the Railway Accounting Officers' Association at Atlantic City June 10, 1925, R. M. Hudson, of the U. S. Department of Commerce, said in part as follows:

"One good reason for this increasing attention to better stores control is the cost of carrying too many varieties. When it was found that the average cost of carrying or maintaining supply stocks was 25 per cent of their value, and the obsolescence accounted for nearly one-half of that cost, the only logical course open was the elimination of the slow-moving, the non-standard, and the excessive varieties so largely responsible for that obsolescence."

Average Carrying Charges for Railroad Stores

Storage facilities	0.25	per cent
Insurance	0.25	"
Taxes	0.50	"
Transportation	0.50	"
Handling and distribution	2.50	"
Depreciation	5.0	"
Interest	6.0	"
Obsolescence	10.0	"
	25.0	per cent

From this it will be seen that Mr. Hudson estimated carrying charge as 25 per cent.

With this background, I will attempt to detail the more important phases of carrying costs.

Interest on investment. This is an item on which there can be little argument. We are aware that borrowed capital costs in a general way 5 or 6 per cent. In order to be conservative, however, we will take the lower figure of 5 per cent.

Handling charge. Every item of material in stock costs just so much to handle. Surplus stocks are far more costly to carry than active materials. It is difficult to fix an exact figure to cover such handling, as we have to make segregation between the actual forces handling materials and the supervisory forces. We may say in a general way that supervision is not affected by over-stocks. Whether we have a sufficient supply to merely meet the needs, or a considerable surplus, the overhead or supervising expense will probably not be affected. When it comes to the actual handling, however, the force or labor dealing with such material, there is an actual outlay that cannot be avoided or ignored. In this connection, I am quoting from a letter received from W. Davidson, general storekeeper, Illinois Central, dated May 11, 1926.

"As a general proposition, obsolete material is handled several times before the decision is reached to scrap it. The handling cost therefore, on obsolete material, is greater in my opinion, than on the average run of material. This is brought about by the reluctance on the part of users and handlers of material to discard material that is apparently in first-class shape and there is a tendency to pass it from one to the other until it reaches the point where some one is willing to take the responsibility for scrapping it."

Material store expense runs generally from 6 to 10 per cent, the spread being accounted for by varying practices, forms of organization, local conditions, volume of work carried on by the stores organization, etc. Eliminating the overhead, and getting down to the actual handling of materials, it is my opinion that we are safe in saying that at least 3 per cent of the average material store expense is chargeable to the actual physical handling of such materials. This item of 3 per cent has been confirmed through my correspondence with a number of general storekeepers of Class I railroads.

Obsolescence. While we are all aware that excess stocks create obsolescence, I have never seen actual figures presented showing what per cent this loss would be. We do know that it varies considerably with different classes of materials. Highly specialized materials or materials representing rapid development or improvement, become obsolete quickly; train control materials for instance. In course of development, a new device will quickly render obsolete materials in stock. We must utilize the best and most efficient equipment that can be obtained in the operation of our shops, power, track, structures, etc. Therefore, any decided improvement is bound to supersede and cast aside previous developments.

There are many times that material can be ordered with no fear of obsolescence, but in this we are sometimes mistaken. When new power is received, for instance, we might readily believe that any materials for such power would be absolutely safe stock. However, when certain castings, a rod, axle, or some such device, develops a weakness, all of the materials in stock in which such weakness was discovered are discarded in favor of a safer material ideas. In the course of improvements on well-developed property, the endeavor is made to use up the old materials before adopting new, where the change is simply a matter of betterment. Where, however, a change is to overcome a dangerous factor or weakness, the older materials are discarded at once.

Another hidden loss lies in materials becoming obsolete in certain uses and utilized for some other purpose. In such a transaction (of which there are many) absolutely no record of the extra cost of utilizing this material can be obtained. In this connection, I quote from a letter received from our Chairman, C. D. Young, dated May 7, 1926.

"*Obsolescence* is established in material by too many uncontrolled decisions, viz: service in which the material is to be used, which varies in engineering practice from one cause or another and the state of the art of the material affected. Material may be acquired in accordance with existing construction for maintenance practice, and in some cases, before delivery is effected the service, a decision, or the operation in which the material was intended to be used may be modified, making its use impossible. Therefore, so far as new material is concerned, obsolescence may take place before its delivery. In the major portion of the material in the material accounts, however, material carried in stock to protect maintenance may become obsolete for the above causes, and in addition, material reclaimed may become obsolete due to any particular causes. To illustrate: a 5-in. by 5-in. shank coupler may be carried in stock out of reclaim, and for some reason the practice of using that size coupler may be abandoned by a railroad. In that case not only those couplers in stock at the time of that decision, whether by purchase, new or reclaim, are affected in the cost of carrying materials; but all couplers removed subse-

quently are subject to obsolescence as they move from the equipment to scrap. There is a large amount of material moving direct from service to scrap which might not be included as obsolete in the cost of carrying material."

Some roads keep a record of materials rendered obsolete, that are charged to operating expenses. The average figures of the five roads from which such statistics were obtained, showed a loss of 200 per cent. It must be realized, however, that this is but a small part of the actual loss. In the first place, it is difficult to find statistics that contain all of the items that have been charged out. There is also a clear loss from such materials released from equipment. Also the items reworked which while still available, represent a distinct loss in this reworking from the purpose for which they were originally purchased. Considering these and other items which cannot be defined, but which enter into these transactions, I feel safe in saying that this percentage will be at least doubled, thus representing a 4 per cent loss from obsolescence. This is not in accordance with the general verdict of students who have carefully considered this question, but I do not feel that anyone can question but what the loss would be at least that as shown.

Deterioration. This is a loss that is impossible to prove, by any definite set of figures, and is, more than anything else, a hidden one. A loss from this cause varies to a great extent according to climatic conditions and in the care taken of materials on different properties. It is the greatest, in damp climates or along the sea coast where the salt air is in evidence, although in the humid climates there is also great destruction from rust. Pipe, bolts, nuts, etc., and such threaded materials, as well as materials in complete make-up such as frogs, crossings, etc., car and engine materials, fabricated steel, etc., are constantly subject to this deterioration. Ferrous materials of all kinds exposed to the elements are subject to rust. This loss in unapplied materials is less at the present time than ever before, for the reason that more attention is being given by railroads generally to the protection of outside or exposed materials. In is a fact, however, that irrespective of general conditions, there are still materials exposed to the elements which in many cases through no fault of the store department but through lack of facilities, are daily causing considerable waste.

This leaves the following items of expense to consider:

Accounting	Storage facilities
Taxes	Wastage
Insurance	Depreciation

The per cent of losses on excess stocks from items above enumerated are not large, but nevertheless every dollar of such investment helps to a certain extent to increase every one of the items.

Mr. Hudson evaluates such miscellaneous at 1¼ per cent. We know that excess stocks increase considerably the accounting or clerical work, preparation of statements, writing off of authorized amounts, etc. Storage facilities are necessarily increased by excess stocks and wastage and depreciation are considerable items. Adding to these, taxes and insurance, which while not vital for excess stocks, are in evidence, I have concluded that we should estimate the losses from these combined classes at 2 per cent at least.

Summarizing the above, the estimates would be as follows:

Cost of Carrying Materials

Interest	5	per cent
Handling charges	3	"
Obsolescence	4	"
Deterioration	1	"
Miscellaneous items (accounting, taxes, insurance, storage facilities, wastage, depreciation)	2	"
Total	15	per cent

It is realized that many will not accept the percentages used. But regardless of this it is the outstanding fact that on every dollar of excess stock the railroads carry, they are being penalized daily. If we realize this and strive to correct any unfavorable situation, we are reducing the carrying cost. We should face the situation squarely, first assuring ourselves we understand the situation, and then bringing the other departments to realize the cost of carrying materials, thus eliminating needless waste.

Discussion

C. J. Mackie (C. B. & Q.): We are all troubled more or less with surplus, slow moving and obsolete material. I wonder if Mr. Hall in his analysis, has been able to discover some remedy that would tend to correct that condition?

Mr. Hall: We know that the more efficient our organizations, the more we can do to hold down obsolete materials, but I am afraid this question will always be with us.

A. J. McKelligon (S. P.): We have materials in our stocks in small amount which are inactive but are known to the users as insurance materials. We have a good deal of ferry equipment and we carry extra walking beams, large cylinders and items of that character, special pumps for power plants—all of which runs into large sums. It is a question whether that should not be charged right to the account. While that would not relieve our responsibility, it might make the user a little more careful in what he ordered.

F. McGrath (B. & M.): I wonder if the store department is not responsible sometimes for obsolete material. We had several cases where they were going to change standards and we happened to be pretty well stocked so I conferred with the using departments who withheld their plans until we used up what we had on hand.

Deterioration

R. C. Harris: (Penna.): One item in Mr. Hall's paper that I want to bring out a little more strongly, is the item of deterioration. Cross-ties, timber and bridge-ties, are especially subject to deterioration and the loss from that cause is more than we usually consider for general material. Deterioration is slight in steel products, but the timber deterioration increases that percentage so much that I felt it ought to be given attention.

H. C. Stevens (Wabash): My experience has been that this insurance is brought about by ordering 6 or 12 units where only one was needed. If we have a first class material stock book bureau watching we can frequently tell that he is ordering more than he actually needs at the instant, and stock can be confidently reduced and still leave the insurance that is justified.

J. C. Kirk (C. R. I. & P.): The thought occurs to me that the reason there is such a wide variation over Mr. Hudson's figures of 10 per cent, and Mr. Hall's four per cent, is the fact that the storekeepers find out that this material is going to be obsolete. So when it comes in the storehouse, they allow a scrap credit for it. In that way the operating expense is immediately credited to scrap and it conceals the expense, so that when Mr. Hall tries to find out from the different railroads what the obsolescence was in a year, he probably got figures of two per cent, whereas it would probably be a great deal more than that.

Special Requisitions

Mr. Hall: As long as we cannot charge out these insurance items, the next best proposition is to make the men who order on special requisitions realize that they are being penalized as well as the company. The average operating man today feels that as long as he has "material on hand" account, he is not affected. Therefore, the best thing we can do to overcome that state of affairs is to show them that it is costing them a considerable amount of money in their operating expenses from the very moment they order that material; that carrying materials by the railroads is an expensive proposition. Every item purchased, sooner or later, finds its way into the operating expenses.

Uniform Observance Of General Balance Sheet

It is recognized that the opportunity to make comparisons of one kind and another between interests engaged in like practices, has been a great help to forward looking managements in gaging their progress, as well as a spur to accomplishment. It is for their value in this connection that close attention has been given to those figures developed on different railroads which purport to disclose such conditions as the value of material and supplies carried in stock, the turnover, etc. But the great difficulty with these figures has been a lack of uniformity in the way in which they are developed on different properties. The purpose of this committee report is to promote a greater degree of uniformity in this respect. Guided by difficulties confronting earlier efforts of the Association in this direction, the committee has devoted its attention to a detailed analysis of the irregularities in accounting and to the formulation of definite recommendations for their elimination in each case.

At the first meeting of your committee it was agreed, that to properly perform its work, the following was essential:

1. That it be provided with complete details as to present methods of various carriers in the handling of their accounting as regards charges and credits to General Balance Sheet Account No. 716 "Material and Supplies," and Road and Equipment Account 47 "Unapplied Construction Material and Supplies."

2. That it be provided with complete details as to present methods of handling charges to Material Store Expenses, Paragraph 16—Special Instructions Operating Expenses.

This information was procured through a questionnaire. Of the 50 railroads canvassed, replies were received from 47, representing a total of 181,645 miles. The information requested was for the purpose of formulating a basis for comparison between railroads of material balances and costs. The committee fully realizes that whatever method is proposed, there will be objections, but it has planned its work on sound principles and made its recommendations in accordance therewith, even though they may not be ideal. The committee is of the firm opinion that definite action should be taken by this Association to meet the general demand for uniform basic methods of material and supplies accounting that will be a step in the direction of making possible comparison of balances and costs, one railroad with another, and it realizes that to make this possible, it is essential that the charges and credits to balance sheet account 716, and Road and Equipment account 47, and charges to Store expenses be uniform in practice for the various railroads of the country. To do this it is appreciated that some railroads will have to modify their present practices to a greater extent than others, but as the results to be obtained benefit the railroads at large, there are no exceptions in the minds of the members of the committee to the recommendation that a definite and determined action be taken by this membership to bring about such desirable results.

No division of Account 716 on the general books of the railroad companies is recommended by this committee, but the proposal submitted does provide for furnishing certain monthly statistics from the present classified material balance sheets, to the Secretary of Division VI of American Railway Association.

From the replies received to questionnaire concerning "Store Expense" it is apparent that uniformity in charges to this account and balance sheet account 716, and Road and Equipment account 47, can only be made possible by concerted action with the railway Accounting Officers Association, and the importance thereof is realized if costs of operating the stores department are to be properly handled. With uniform accounting and division of balances mere comparison of results will not always prove efficiency or otherwise, any more than it does today in comparison of pounds of fuel consumed per gross ton mile, trainloads, carloads, locomotive miles per hour, etc., but your committee does feel that with uniform accounting and division of balances, a comparison on the basis of months' supply on hand, is entirely practicable and essential for the best economic results.

If we are to progress, we must constantly study our operations with a view of finding more efficient methods and reduced costs, and comparisons can only be made when uniformity applies in the basic factors, and it is the earnest hope of your committee that the members of the Association will take such action on this report as will make possible comparisons of investments and costs, and this, it is the opinion of the committee, can be done by all railroads without any added expense to them.

Recommendation: The committee unanimously voted, that in accordance with the provisions of Interstate Commerce Commission Classification Account 716 that all materials and items covered by questions (A) to (J), inclusive, should be charged as and when received to Account 716 and credited therefrom only as and when applied, except small tools, supplies, and oil and waste which should be credited therefrom as and when delivered to the using departments for current use, and it is recommended that this general observance of Account 716 be made universal. The only exception the committee makes to this procedure is in connection with items properly chargeable and creditable to Road & Equipment Account 47 hereafter referred to.

Action on Questionnaire

Q. (1). Does your monthly balance Account 716 include the balances representing the value on hand of:

	Yes	No
(A) Road Material (all M. of W. & S.) Ans. (mileage)	88%	12%
(B) Shop Material	100	..
(C) Articles in process of manufacture	100	..
(D) Fuel, Loco. and Misc.	100	..
(E) Stationery	94	6
(F) Dining Car Supplies	96	4
(G) All Scrap	94	6
(H) Misc. Materials and Supplies other than those for shop and M. of W. & S. purposes	100	..
(J) Uncleared Store Expense	40	60

Q. (1). (K) Purchased materials received but for which invoices have not been formally debited to the department material balances.
A. Yes 30% No 70%.

Recommendation: Committee vote 5 yes, 3 no. It is recommended that the committee's majority vote be understood to include value of materials used from so-called "Consignment Stocks."

Q. (1). (L) Cash Discount invoices paid but on which the materials have not been received.
A. Yes 60% No 40%.

Committee vote 2 yes, 6 no. It is recommended that the committee's majority vote be approved.

Q. (1). (M) Materials retired from property and equipment, but not released.
A. Yes 32% No 68%.

Committee votes no.

Q. (1). (N) Postage Stamps.
A. Yes 51% No 49%.

Committee votes yes.

Q. (1). (O) Labor items not properly chargeable as part of material costs.
A. Yes 12% No 88%.

It is recommended by the committee that the practice of including unrelated labor expense items in Account 716 be discontinued.

Q. (1) (Q) Additional Items.

Replies from the majority of railroads show practically no additional items for inclusion in Account 716. However, where companies operate hotels, steamships, marine equipment, etc., the unapplied material thereof should be carried in Account 716.

Q. (2). Do you charge any of the following groups of materials to Operating Expenses or Investment Accounts prior to its actual application? (Actual application as here used does not apply to current useable material on shop floors).*

	Yes	No
(A) M. of W. & S. materials for maintenance. Ans.	26%	74%
(B) M. of W. & S. materials for Additions & Betterments projects	11	89
(C) Shop Material (Loco.)	2	98
(D) Shop material (Cars)	2	98
(E) Other materials	7	93

(*) The roads voting "Yes" are not to be understood as applying to all M. of W. & S. materials, each road handling peculiar to themselves.

Recommendation: The committee recommends that with the exception of small tools, supplies and oil and waste delivered to foremen for current use, all materials be carried in account 716 until actually used, that materials for Additions & Betterment projects be charged out of Account 716 only as and when used, and that locomotive shop, car shop, and other materials be charged out only as and when issued for current use.

Q. (3). Do you feel that the charging out of any materials (not tools and supplies distributed to the using departments) before their actual use is contrary to the "All Unapplied Material" stipulation of Account No. 716?
A. Yes 81% No 19%.

Recommendation: It is the sense of the committee that the charging out of any materials, not small tools and supplies, or oil and waste for current use, before their actual use, is contrary to the, "All Unapplied Material" stipulation of Account 716.

Q. (4). Do you have working stocks, i. e., stocks as indicated below where the previous inventory value is carried as stock until another inventory is taken at which time the fluctuations in value are charged or credited to operating expenses? During the inventory intervals the replenishments are charged out.

	Yes	No
(A) M. of W. & S. materials. Ans.	20%	80%
(B) Shop material (Frt. Car)	35	65
(C) Shop material (Pass. Car)	26	74
(D) Shop material (Loco.)	14	86
(E) Other material	2	98

Recommendation: The committee recognizes the necessity, according to local conditions, of carrying working stocks, where the previous inventory value is carried as stock in Account 716 until another inventory is taken, at which time the fluctuation in value is charged or credited to Operating Expenses. During inventory intervals the replenishments should be charged out. It is suggested, however, that the amount to be carried be minimized and inventoried at stated periods throughout the year. The value of these accounts, however, is greatly dependent upon proper policing and charging out of the replenishments. Working stocks are recommended on the basis of economy to the railroad company and without creating improper accounting. Committee's vote 7 Yes, 1 No.

Q. (5). Is it your practice to carry materials for new roads and extensions in Road & Equipment Account No. 47?
A. Yes 4% No 96%.

Recommendation: The committee feels that Road & Equipment Account No. 47 should only be used to cover the cost of materials and supplies located at the point of use, held exclusively for projected new roads and road extensions and under the condition that the material will not be used for other purposes.

Q. (6). Is scrap released from service charged to the material account and credited to operating accounts, etc., on the basis of the release or when sold?
A. Released 91% Sold 9%.

Recommendation: It is the sense of the committee that when scrap, etc., is released, that proper credit be allowed to operating account and charged to Material Account 716 at the time of release.

(Name of Railroad)

Show all values in dollars, omitting cents.

Month of.....

Material and Supplies	On Hand First of Month	Purchased Including Freight Charges	Actual Disbursements to Closed Accounts and Sales	On Hand End of Month	Months Supply On Hand End of Month
Grand Total All Items.....					
1. Ties, Cross Switch and Bridge					
2. Rail, New.....					
3. Rail, Relay.....					
4. Signal, Interlocking, Telegraph and Telephone Material.....					
5. Bridge and Building Lumber and Structural Steel.....					
6. All other track material.....					
7. Material held specifically for Additions and Betterment Work.....					
8. Fuel, All.....					
9. Ice, Storage.....					
10. Dining Car and Restaurant Commissary Supplies.....					
11. Stationery, including Postage					
12. Material in process of manufacture.....					
13. Scrap, all kinds, including Scrap Rail.....					
14. Maintenance of Equipment, and all other material.....					

The Form on Which it is Proposed that All Railroads Submit Information About Material

Q. (6). (A) At what value is servicable released material carried in stock (this includes material released which can be used without work thereon and that which requires work thereon)?
A. The replies indicate varying practices regarding "Values on Released Materials" from scrap to cost of new material.
Q. (6). (B) If such material is released and credited as scrap and later used and priced at new value or a fixed percentage thereof, what disposition is made of the margin between the scrap credit price and the issue price?
A. The general practice is to credit to operating accounts.
Q. (6). (C) If such material is carried and reissued at the scrap price, to what is the expense of reconditioning charged?
A. The general practice is to charge to the accounts benefited.

Recommendation: The opinion of this committee is that the definite recommendations should be continued for next year's committee, with instructions that it be required to establish and formulate a uniform practice for valuing the accounting for serviceable and released material and scrap; this committee to review the replies received this year and bear in mind that the railroad is entitled to a proper return on materials for additions and betterments, and earnings on reasonable investment value in material, and that for comparison of balances by the railroad, such uniform instructions and practices are essential.

Q. (7). Do you interpret Account 716 as instructing that the latest cost price should be used on issues and inventories?
A. Too varied for concise tabulation.

Recommendation: It is the sense of the committee that on all disbursements and inventories the cost price to the railroad, as provided for in Account 716 should be used; this does not mean that average prices for charge outs do not constitute cost prices, and replies from the majority of carriers indicate that this is the universal policy. It is the committee's opinion, based on replies received, that variations in Account 716 due to minor differences in pricing methods for purchased material have very little effect on the balances.

Q. (8). Do you take up as disbursements the value of raw materials issued on manufacturing orders and also show the finished product as a disbursement when used?
A. Replies indicate that many railroads in arriving at their system turnover include two, and many times, three disbursements for raw materials used in the manufacture of finished products.

Recommendation: For the purpose of arriving at system disbursements and system results to express months supply on hand there should only be included the value of materials charged to operating expenses, property account, individuals and companies, and other closed accounts.

Q. (9). Do you believe that there should be a uniform classified balance sheet that all railroads would use to state the monthly material and supplies balance as carried in Account 716; this balance sheet to show also the monthly receipts, disbursements, balance, turnover, etc.?
A. Mileage. Yes 69% No 31%.

Recommendation: It is recommended that there be adopted a uniform classified material balance sheet in form and general headings as per the attached sample. Exhibit A. It is further recommended that if this recommendation is approved, that next year's committee on this subject be instructed to prepare the necessary instructions.

Q. (10). Do you recommend that a report of Material & Supplies account divided into certain designated items only be prepared from classified material balance sheet, having no effect whatever on the general balance Account 716?
(1) Statistics as above referred to be furnished to the American Railway Association, through the Secretary of Division VI, Purchases and Stores.
(2) Each railroad to send to the A. R. A. monthly, a copy of its classified balance sheet Exhibit A, from which an A. R. A. Bureau will prepare statements indicating the following for each of the 14 accounts listed.
(A) Amount on hand at end of month for which reporting.
(B) Month's actual disbursements to closed accounts, including individuals and companies.
(C) Month's supply on hand.
A. * Mileage. Yes 85% No 15%.

(*) The "Yes" replies in many instances however, indicated different divisions.

Recommendation: The committee recommends: 6 in favor, 3 opposed.

Q. (11). Do you maintain records indicating cost of handling materials by points, and Total Store Expense for railroad by points?
A. Yes 83% No 17%.
Q. (11). (A) Do you make material deliveries to using departments, and if so is the cost of delivery charged to Store Expense?
A. Yes 78% No 22%.
Q. (11). (A1) If delivery men are carried on Store Department payroll, is charge made to other than Store Expense?
A. Yes 67% No 33%.
Q. (11). (B) In arriving at your costs, do you distinguish between material and scrap?
A. Yes 70% No 30%.
Q. (11). (C) Is the cost of scrap handling charged to revenue from scrap?
A. Yes 57% No 43%.
Q. (11). (C1) Is the cost of scrap handling charged to Store Expense?
A. Yes 43% No 57%.

Recommendation: It is recommended that records indicating cost of handling by points be maintained separately for materials and scrap, and that such record be based on total value of material handled both in and out divided into the total local costs of handling materials excluding deliveries made to shops so as to arrive at cost of handling per $1000 of material, scrap costs to be separated in the same manner and costs per gross ton determined.

Q. (12). What would be a fair measure of comparison for cost of handling?
A. Varied replies. See Question (11).
Q. (13). Explain in detail all items which are included in and charged to Store Expense.
A. Replies indicate many variations in charges to this account.
Q. (14). Show detail of basis on which Stores Expense is distributed to Expense Accounts.
A. Replies indicate on basis of issues.

Recommendation: The committee recommends in view of the many variations in practices that this subject be continued for next year's committee, with instructions to that committee that they shall prepare the rules and procedures for all detail items which may be included in Stores Expense, and enumerate them and where other items are being charged to Stores Expense that belong to other accounts, rules be made for the disposition of such items in those other accounts.

Committee:—A. L. Sorensen, (chairman), manager of stores, (Erie); O. A. Donagan, general storekeeper, (B. & M.); C. C. Dibble, general supervisor stores, (N. Y. C.); A. A. Goodchild, general storekeeper, (C. P. R.); L. P. Krampf, supply agent, (M. P.); O. B. Mills, assistant general storekeeper, (Penn.); J. C. McCaughan, general storekeeper, (H. V.); C. H. Murrin, special accountant, (I. C.); J. L. Sullivan, general traveling storekeeper, (U. P.); H. H. Laughton (chairman ex-officio), assistant to vice-president in charge of operation, (So.).

Discussion

Chairman Sorensen: The committee feels it is their duty to direct attention to the article in the *Railway Age*, April 24, 1926, in which it was indicated that 68 railroads are carrying a surplus of approximately $168,000,000 in material balances. The members of this committee do not subscribe to the determination of comparisons of balances on the basis employed in that article, but direct attention at this time to the importance of some concrete basis for comparisons and for meeting such statements. It is only by concerted action on the part of the various roads towards a uniform practice that progress can be made in this direction. It is, therefore, the recommendation of your committee that the result of this year's work be turned over to next year's committee with the request that they complete the studies in conjunction with the Railway Accounting Officers Association, with the hope that uniformity will soon be brought about in accounting methods.

The Chairman: It is the suggestion of the chairman that we take up the committee's recommendations separately. *A motion to adopt the recommendation covering items A to J inclusive under Question I, was made and carried, whereupon a motion was made and seconded to adopt the recommendation covering item K.*

J. W. Gerber (Southern): Do I understand that material received but invoices not yet received will be carried into Account 716?

The Chairman: That is the intent.

Mr. Gerber: How would you arrive at the value?

Mr. Sorensen: On an estimated basis.

Without further discussion the motion to adopt the recommendation was put to a vote and was lost, which action also defeated the recommendation covering Item L. The recommendations of the committee relative to the remaining items under Question I were then acted upon one by one and adopted without discussion.

No action being necessary on the recommendations covering Question 2, motions were made and carried without discussion to adopt the recommendations covering Question 3, and Question 4.

The action on the subject matter of Question 4 was of two kinds, the committee's recommendation covering the question generally was adopted as standard practice leaving the recommendation to continue the study of Items A, B, and C, which was accepted.

The recommendations covering Questions 6 and 7 were also adopted as standard practice without discussion.—Editor.

The Chairman (referring to the subject matter in Question 8): It is recommended that there be adopted a uniform classified material balance sheet in form and general headings as shown in Exhibit A. It is further recommended that if this recommendation is approved, that next year's committee on this subject be instructed to prepare the necessary instructions. Referring to Exhibit A, Grand Total All Items (see illustration), item 1 now reads, "Ties, cross switch and bridge." The committee desires that it be changed to read, "Ties, cross and switch," taking out the words "and bridge."

Motion made and seconded to adopt the recommendation.

W. F. Munster (B. & M.): With reference to item 5 "Bridge and Building Lumber and Structural Steel," on Exhibit A. Should not the item "Structural Steel" be eliminated? My thought in establishing this exhibit here would be to prepare it so that it could be drawn off the A. R. A. standard classifications. Structural steel does not stand as an individual item in the A. R. A. classifications.

D. C. Curtis: (C. M. & St. P.): Would it not be possible for the committee to use the material classifications as adopted by the A. R. A. so that there would be no question of the items going into these different subheads?

The chairman: Mr. Curtis' suggestion is that in addition to the words shown under the several captions, the committee should enumerate the material accounts which are in each of those captions.

A. P. Dunbar (B. & M.): The exhibit says, "Purchased Including Freight Charges," but it does not say anything about second-hand material returned to stock.

Chairman Sorensen: That was intended to include all material and the figures here would be the total as shown on your balance sheet.

H. C. Stevens (Wabash): I would like to ask the chairman of the committee how it is expected that this organization can put this in effect? It seems to me that the classification of your balance sheet will have to be put in effect by the accounting officer. Secondly, I would like to ask if they considered the adoption of the classified stock balance the same as our classified stock book, and if so why they felt that it was not the most practical thing to have as an accounting balance, if we are going to have a classified balance sheet?

Chairman Sorensen: The intent of this exhibit, was not to get away from the classified balance sheet but to modify it for the purpose of detailing Account 716 and preparing figures for the individual roads through the secretary for comparative purposes of month's materials on hand. As to the accounting features, it is only intended to carry out these in cooperation with the Railway Accounting Officers Association.

Mr. Stevens: I still do not understand clearly on just what basis it would be preferable to make this classification for accounting purposes rather than to go the full limit.

Chairman Sorensen: One reason is that, first of all, all railroads are not handling the A. R. A. classification. Secondly, we concluded that classifications would entail entirely too much work to be handled and recapitulate for the various railroads of the country, and we felt that the same results could be procured through the 14 classifications indicated.

Mr. Stevens: I still am opposed to the adoption of a classification in this association for accounting purposes that is different from our first classification.

Ry Age—No. 551—Copy 17 to 18

Chairman Sorensen: It is not intended to adopt this as any classification for your own material balance sheet or in any way to change the present A. R. A. Material Classification.

J. A. Stuart (C. B. & Q.): It would seem that in getting up a balance sheet such as is proposed each heading should include full classes and so that it will not be necessary to split classes of our regular A. R. A. classification sheet, in order to put part of one class into these other classes and not all of them.

Take structural steel, for instance. We would con-

sider that a steel center sill for cars would be structural steel, but it is in an entirely different class from steel bridges. I am quite sure that in order to take out the amount, that is in steel center sill work, and other items of that class, we are going to have to keep a special record.

Chairman Sorensen: That was the intention, and item 5 should have read "Structural steel for bridges," which is your regular Classification 6.

Without further discussion the motion to adopt recommendation covering the subject matter under question 9 and including the proposed form shown in the Exhibit was carried, whereupon the motion was made and seconded to adopt the recommendations covering the subject matter under question 10.

Mr. Stevens: Why exclude shop deliveries at local points any more than at other points?

Chairman Sorensen: The intention was to make more comparable comparisons of one railroad with another. It is realized that the accounting people charge shop deliveries to store's expense. At the same time, for comparative purposes, on the costs of handling materials, we feel it is far more desirable to leave shop deliveries out.

C. B. Tobey: (L. V.), Why did the committee recommend that the total value of the material handed both in and out be considered? It is only one item, one dollar's worth of material, whether it is handled two or three times. It is the same material all the way through.

Chairman Sorensen: The committee felt that the number of times the material was handled was actually the proper measuring stick. On acount of varying conditions at different points, it is necessary in some instances to handle material more than once, where under somewhat similar conditions at other points you would handle it but once. But in justice to the local points, it was felt entirely justified to use as a base the number of times the material was actually handled. In addition, there are no objections to using it on the basis of handling once, regardless of the fact that it is handled three times.

Without further discussion the motion to adopt the recommendation was put to a vote and carried, following which no action being necessary on the final recommendation, the committee was excused with a special vote of thanks by the association.

Stationery and Printing

James Deery, Chairman

The concentration of the purchasing and handling of stationery in a relatively small circle has not blinded railroads to the very considerable economies to be gained through improvements in the methods and policies under which this work is administered. This is evidenced by the interest which the Association has taken in this subject for several years past. A review discloses that the proceedings of the Association contain numerous reports on the subjects and that much information of practical value has also been afforded in special papers. These discussions have dealt particularly with standardization. The need and opportunities for further progress in the direction of standardization has led this year's committee to supplement previous reports with further discussions of combination printing and the presentation of specifications for tariff printing. This is the second term of office for the committee chairman, James Deery.

In the 1925 report the committee touched on the economy of standardization, but could suggest no definite method except that each railroad give the question careful study with a view of determining what sizes of blanks, cut from basic sheets, will fit requirements. The answers to our inquiry sent the various members indicate that the railroads are not ready to adopt a standard size sheet.

It is recognized that a railroad having used for a number of years a paper of a particular size would be disinclined to accept another standard. However, when the railroads have agreed on standard sizes all will be benefited in that the printers can run the forms for one railroad with those of other railroads.

While the lack of uniformity of sizes makes it impossible to print forms for several railroads at one operation, it is recommended that each railroad set up a system that will enable it to order printing in combinations. Care should be taken to avoid ordering a form simply to complete a combination or to increase the quantity of a certain form in order to cut the cost of "make ready."

To assist individual railroads in printing in combinations or gangs, forms of a specific paper substance in sizes and multiples cutting from basic sheets as outlined in the committee's 1925 report could be accumulated over a period of time and then sent to the printer to be set up and printed at one time in combination or gang. It would be better if the purchasing and stores departments could set up some method so that their blanks will be ordered in groups that will enable their printer to set up the type so that they can be run in combination or gangs.

Investigation has shown that forms in quantities up to 50,000 can be printed in combination at a considerable saving in cost. Further, the accumulating of forms to print in combinations assists very materially in confining forms to sizes that will cut from basic sheets without waste.

Tariff Printing

The figures available show out of every million dollars received as revenue, the railroads spend $1,100 for tariff printing. On this basis the railroads spent in 1925 for this item $6,805,000, enough money to provide 90 lb. rails for 1120 miles of track.

A standard specification for the printing of tariffs will confine this expenditure at a minimum. The committee is recommending below a specification which it feels will assist the purchasing agents in the printing of tariffs and checking of invoices.

Size: 8 by 11 inches.

Binding: Saddle wire or side stitched, as required.

Printing: One color ink throughout (black) with right to specify without extra cost, colored ink where special circumstances require it.

Composition: 6 pt., 8 pt., 10 or 12 pt., as required. Standard type faces only shall be used.

Stock: 33 by 46—80-lb. M. F. Tariff.

Alterations: After first proof any changes made from original copy, which changes will be shown in red. Each page of any proof submitted after the first proof has been corrected will show the actual amount of time required to make the corrections and the total time will be shown on the last page of each proof submitted. The total time for corrections in each proof will be charged as a separate item in accordance with the list rates and rate per hour agreed upon.

Proofs: Galley and page proofs. Three sets of galley proofs of original composition, and three sets of first page proofs without extra charge.

Blank Pages: Not over three blank pages per issue, except that when three blank leaves on tariffs with multiple signatures are provided printer will handle without charge.

Covers: For large tariffs, 18 by 23—35½-lb. Ledger stock or equal, and for extra large tariffs, Document Manila.

Overtime: Only where authorized in advance by purchasing agent.

Standing Type: Where type is standing out in proof 90 days, notice to be sent to the purchasing agent by printer to avoid charge for storage. When a tariff has been cancelled and discontinued and the type will not be used again, or when the tariff has been assigned to another company, original printer shall be notified to reduce printers' storage of dead material.

Purchasing Agent in arranging for price schedule should cover all details, as follows:

Composition set and not used.	Paper discount.
Map pages.	Reissue discount.
Inserts.	Reprint discount.
Tipping.	Quantity discount.
Punching.	Wrapping and mailing.
Interleaving.	

Envelopes

It is a proven fact that the use of "repeat" envelopes have saved thousands of dollars for railroads; and your committee, upon investigating the matter, feels that even more extensive use for greater savings is possible.

A standard form of the following specifications is recommended for general use:

Size No. 10.
Ungummed flap.
Punched two holes.
Stock: 20-Sub. No. 1 Sulphate Kraft.
Printed.

Some railroads use other forms and sizes of Kraft report envelopes for mailing such items as tariffs, agents' reports to the auditor freight traffic, car accountant, general baggage agent, and for other intra-company reports and correspondence, which your committee endorses.

One member line reports that in 1925, 4,600,000 less commercial size envelopes (6's, 10's and 14's) were used at a saving of $5,084,32, as compared with quantities used in year 1914 before repeat envelopes were adopted on that railroad.

It is a matter that requires co-operation and constant vigilance on the part of all offices to prevent the use of a sealed envelope where a "repeater" can be used, and every road should therefore concentrate on this subject for further and more extensive use of "repeaters" as the savings possible are well worth while.

Committee: James Deery, assistant to purchasing agent (Penn.), J. L. Bennett, purchasing agent (C. of G.); W. A. Clem, assistant purchasing agent (Reading); Clyde Cocke, purchasing agent (N. & W.); Dan Delaney, stationer (C. & A.); W. W. Fulmer, general purchasing agent (American Railway Express); W. W. Griswold, stationer (C., R. I. & P.); V. R. Plank, stationery storekeeper (S. P.); J. T. Van Horn, stationer (M. P.); J. L. Woods, purchasing agent (N., C. & St. L.); and C. E. Walsh, assistant purchasing agent (Penn.), chairman ex-officio.

The report was adopted as presented without discussion.

Stationery and Its Control

By V. R. Plank

Stationery Storekeeper, Southern Pacific, Pacific Lines

V. R. Plank

This paper deals with the staple stocks of stationery excluding office equipment, tariffs, advertising, ticket stocks, etc., and touches more directly on control of on line stocks.

This desk supply used by the railroads annually amounts to millions of dollars. The Southern Pacific—Pacific Lines—spent $508,000 last year to take care of the requirements of this class of stationery, or, almost enough to cover the yearly paper bill of a large metropolitan daily. If all this stationery were loaded in a single train 85 freight cars would be required to handle the tonnage.

To the individual using paper in its various forms paper is a small item, but, for an entire system it is one of the large expenses in the operation of the property.

To furnish eight general use forms last year required 39,863,150 sheets of paper for one railroad. A total of 12,624,000 of pins are required on a railroad annually. Some years ago the pin expense was discussed in the stationery department of the Southern Pacific and it was determined that the steel pin, instead of the brass pin, would take care of the requirements. Upon changing specifications from brass to steel we reduced annual purchases of the pin $1,500. When it is considered that the pin is only one among 5,700 items handled by a railway stationery department, it becomes apparent how wide is the field for conservation.

The stationery department should be active in conservation and control of all stocks on hand in the store and have before them the importance of reducing the cost of the various items, along with the proper control.

In the stationery store, Southern Pacific, Pacific Lines, we have a paper cutter which cuts paper, cardboard, and other stocks of all kinds. Stamp pads and mucilage are manufactured, typewriter oil bottled, binders and binding cases reclaimed, and waste paper sold. These activities and others yield net saving of $10,000. Pins, pencils, pens, erasers, are continually being ordered from line points. The issues include 364,425 pencils, 152,406 pens, 12,624,000 pins and 44,748 erasers in a year.

Care of Stationery

In large line offices stationery should be kept in a room, in which is kept a mimeograph machine, schapirograph machine, dictaphone shaving machine, binding machine, etc., and a department with a competent man in charge should be created to take care of all of this work.

It is necessary at times on account of change in conditions and methods to revise forms. In order that the old forms are used before commencing the use of the new forms, the new forms should be kept at the bottom of the old forms.

Very few employees know the difference between chemical, flat white, and bond paper, nor, the value. A competent employee should supervise the handling and ordering of stationery if we are to be assured of having it properly used and controlled to the end that we get out of it what we should.

Most of the value of stationery is in paper, forms, and books, and there is so much resemblance, one item with another, that a hurried inspection cannot be made to determine if stocks are excessive. With stationery a record of receipts and issues must be maintained, to determine the condition of this stock as to quantity on hand.

An agency requires several hundred different forms and to properly check these some specific and well defined method should be used as a guide in replenishing stocks. I know of no better means than by the aid of the stock book. This book will show all of the different items that must be maintained and will disclose the quantities required to take care of business for a specified time. The stock book will be the means of keeping surplus off the line and will be responsible for minimum stocks on hand in the central store.

On the Southern Pacific a stationery stock book has been in operation in all on line offices for 12 years and is yielding satisfactory results. There are 1,000 of these books now in use. The traffic and mechanical man, superintendent and agent, engineer and roadmaster, is a storekeeper in that he inventories quantities of stationery on hand in his office at stated intervals, records his orders and receipts, and from these figures arrives at actual quantities used during past period and places orders for the various items in conservative quantities.

We have been asked what factor could be used in determining the value of stock that should be carried in a stationery store. The stock book is the only answer. Value comparisons cannot be made because of the different methods of the various roads in storing and handling stocks, but, if each road had all of their on-line-stocks controlled by stock books, the stock balance would be in a satisfactory condition.

We have found it economical to provide facilities for stationery and it is absolutely necessary that it be done if this commodity is to be properly taken care of. It is a perishable item. It cannot be handled many times without causing it to become dog-eared, wrinkled, and unfit for use. Some protection should be afforded it.

Stocks of stationery should be consolidated or centralized wherever possible. In buildings where large quantities of stationery are used, stocks should be in one place in charge of a competent employee reporting to the stationery storekeeper. Under such a plan large stocks of items of general use will be eliminated and better control generally will result.

Stock used by freight crews should be handled the same as

material and should be placed in cabooses in a stationery kit and only in such quantities as are required for a few trips. The store man should handle this, supplying stationery the same as fusees, torpedoes, packing, oils, etc.

Passenger crews should have stationery (forms) in conductors' rooms in cabinets and the cabinets taken care of by a store man. The plan of making it difficult for conductors to get stationery and then allowing them to draw it from an office, issued by an employee not particularly interested in stationery, results in the issuance of large quantities of stocks.

Reduction of stock issued to freight train crews on the Southern Pacific has been exceptionally large since this class of stationery was turned over to the division storekeeper for handling.

Stationery requires constant supervision. All division staff officers should interest themselves in seeing that this commodity is controlled. Properly mantained stock books, along with necessary facilities, will guide any officer in determining if stocks are excessive.

In the absence of Mr. Plank, his paper was presented by W. A. Clem (Reading.)

Standardization and Simplification of Stores Stock

Photo Bachrach
A. G. Follette
Chairman

With word pictures which gave much color to last year's proceedings the author of a special paper sketched the possibilities for economy and other accomplishments that lie before railroads in processes of standardization and simplification of material and supplies. In its report this year the committee on this subject, under the leadership of the same person, presents information on the progress which has been made by many railroads in reducing stock by this process. It reemphasizes the importance of stock books and as an aid to their use endeavors to outline exactly what material and supplies should be reported in such records. Methods of computing the savings resulting from simplification work are also discussed, while specific recommendations are presented as to the sizes of certain commodities to which railway purchases should be confined. A. G. Follette is completing his first term as chairman of the committee and the second year as a member.

Road	Number of Items in Master Stock Book		Added due to newly adopted types of equipment and devices	Remarks
	Jan. 1, 1925	Jan. 1, 1926		
A	34,000	38,000	1200	Remainder added due to working out details of forgings and fabrications so as to list.
B	30,719	29,877	.....	Eliminated 3020 items July 1, 1925, to Jan. 15, 1926. Classes 11, 15, 23, 25A and 36.
C	23,346	24,277	.....	1581 eliminated due to addition of others.
D	73,595	84,136	.....	Increase, despite consistent standardization, due to newly adopted types, equipment and devices.
E	45,852	46,739	.....	Increase due to merging of new line, items not yet matched up and simplified.
	40,126	40,720	.....	
	54,154	59,296	.....	
F	30,579	32,700	2437	
G	38,198	33,213	1459	6444 items eliminated.
H	65,277	65,976	1466	
I	17,438	17,554	469	
J	63,486	61,442	2815	Eliminated 4859 items—Committee working and expect several thousand further reduction.
K	60,916	60,603	412	
L	41,200	42,100	1720	
M	45,482	45,913	1402	
N	74,515	71,596	1379	
O	23,500	27,800	.....	
P	18,545	19,040	.....	
Q	52,900	51,369	.....	A number of items were added due to newly adopted equipment.
R	40,427	40,597	709	
S	28,900	28,900	.....	Committee working—eliminated 2471 items in 7 classes.
T	26,281	26,781	500	
Total	929,436	948,629	15968	
U	Unable to give figures at this time, but is in the midst of a special campaign of simplification that should produce real results.			
V	Unable to give figures, but have made considerable reduction through stock control system and expect to organize a representative committee to go into the whole matter more thoroughly than heretofore.			

In order to develop what further interest has been aroused and results achieved during the past year, Class I railroads were questioned as follows: "How many items of material were listed in your master stock book on January 1, 1925?" "How many on January 1, 1926?" "How many were added during that period, due to newly adopted types of equipment or devices?" The information given in reply is tabulated in the accompanying table.

Roads not maintaining a master stock book record were unable to give information as to the number of items. This fact emphasizes the importance of maintaining such a record as a basis of simplification, as brought out in the 1925 report on this subject.

Items That Should Be Listed

It is realized by the committee that figures indicating the number of items in the master stock book of one railroad cannot intelligently be compared with those of another road, unless it is known what rule is used in determining whether or not an item should be listed in the master stock book.

In order to develop the practice in this respect, the railroads were asked to advise if they have any rule defining when certain items infrequently purchased for special purposes should be listed in the master stock book, or what frequency of purchase, extent of distribution or use justifies so listing; or if all items are so listed whether used generally over their road, or at one or two shops only.

The information developed is classified under three methods as follows:

1. All items of a standard nature, that are stocked at more than one store are listed in the master stock book.

Several of the roads following this practice list special material stock not contained in the master stock book on index cards or on separate sheets in the master stock book, so that a record may be had of all items of stock. In some cases this is used merely as reference, in others, requisitions for special material not listed in the standard master stock book are checked against the card record or special stock book sheets before purchasing the material.

2. All items purchased or stocked are listed regardless of frequency of purchase or extent of distribution.

3. No definite rule. Each case is decided on its own merits.

These three methods represent, in general, the practices of all roads reporting who maintain a master stock book. The first method is by far the most general.

It is recommended that the Standard master stock book of a given railroad should contain all items of material that are standard to that road or that have been approved for use by the proper authority provided it is necessary to order or stock at two or more stores or at one store for distribution in several others.

Material ordered or stocked for use at one store only should not be listed in the standard master stock book, as the method of supervision of such stock is different from that of generally used material, there being no question of transfer from one store to another.

A master stock record should be maintained of all special items not listed in the standard master stock book for reference purposes, either on cards or special stock book sheets, so as to better control the quantities of such material being ordered; so that an intelligent effort may be made to keep the number of such items to a minimum, and that any inactive stock of such material may be liquidated by substitution on orders for standard material or for special material of a similar nature.

Simplification

While much can profitably be done from a purchasing and distribution standpoint by the railroads, working independently, in reducing the number of sizes they use, maximum benefits will accrue only when all the railroads standardize on

the same steps in size in a given commodity. It appeared to the committee that this subject had been developed sufficiently to warrant an attempt to simplify some commodities this year. It was decided to begin with those groups of material that can be simplified with the least amount of controversy and detailed investigation, and which have not already been considered by the Division of Simplified Practice of the U. S. Department of Commerce; so that the work of this Division may supplement rather than duplicate the work being done by the Government Bureau.

The railroads were requested to furnish a list of the sizes used and their average monthly consumption in the following commodities:

Boiler lagging.
Carriage bolts.
Hexagon head machine bolts.
Square head machine bolts.
Locomotive boiler rivets.
Structural rivets.
Copper tubing.

Twenty-nine of the 32 Class I railroads furnished the information requested.

Only 13 of the 29 railroads reported using hexagon head machine bolts and for this reason the committee believe that the use of this type machine bolt ought to be discouraged.

In tables which have been prepared showing standard sizes of boiler and structural rivets, no distinction has been made as to the shape of the head. This is considered a technical question coming under the jurisdiction of the mechanical and engineering divisions, who it is believed, should standardize this feature so that maximum benefits may be obtained from a purchasing and distribution standpoint. Countersunk and flat head rivets have been disregarded in the tabulations, as the use reported by railroads is not considered sufficient to warrant simplification at this time.

The sizes of copper tubing reported are very numerous, different railroads often using different gages to designate wall thickness, 204 sizes and wall thicknesses were reported. As steam pressures are involved in the question of wall thickness of copper tubing, it is the opinion of the committee that the technicalities involved are such that the assistance of Division V, Mechanical, should be requested and to this end a tabulation of the sizes and wall thicknesses reported by the railroads has been compiled.

Form A. R. A. VL—12-16

PURCHASING DEPARTMENT STATISTICAL RECORD

Year 192....	Number of Requisitions Received	Number of Orders Issued	Number of Invoices Received	Value of Purchases made Based on Orders Issued	Value of Purchases made Based on Invoices Received	Value on Unfilled Orders or Commitments for Material Outstanding at end of Month	Number of Sales Orders Issued	Value of Sales Made	Tonnage of Scrap Sold	Number of Employes	Amount of Payroll
JANUARY											
FEBRUARY											
To Date											
MARCH											
To Date											
APRIL											
To Date											
MAY											
To Date											
JUNE											
To Date											
JULY											
To Date											
AUGUST											
To Date											
SEPTERMER											
To Date											
OCTOBER											
To Date											
NOVEMBER											
To Date											
DECEMBER											
Total for Year											
Total Previous Year											

The following additional headings are suggested as covering statistical information which certain roads may wish to include on the form.

1. Total number of items on requisition.
2. Total number of items on orders.
3. Amount of discount taken.
4. Number of vouchers issued (where vouchering is done by Purchasing Department).
5. Number of unfilled orders over 30, 60, 90, 120 days old.

Where it is desired to have the information as to the number of Sales Orders issued, and Value of Sales Made, divided between scrap material and all other classes of material, appropriate additional headings may be added.

Tables Showing the Sizes of Various Materials Proposed as Standards for Use

Using the information thus furnished the sizes showing comparatively small consumption and used by few of the roads were eliminated and the sizes your committee recommends be retained as standard, appear in this report as follows:

Table I—Boiler lagging..... { 57 sizes reduced to 5—91 per cent reduction. 91 per cent eliminated represents 28 per cent consumption.

Table II—Carriage bolts..... { 220 sizes reduced to 82—63 per cent reduction. 63 per cent eliminated represents 3 per cent of consumption.

Table III—Square head machine bolts.. { 738 sizes reduced to 214—71 per cent reduction. 71 per cent eliminated represents 7 per cent of consumption.

Table IV—Locomotive boiler rivets.... { 272 sizes reduced to 57—79 per cent reduction. 79 per cent eliminated represents 14 per cent of consumption

Table V—Structural rivets..... { 389 sizes reduced to 78—80 per cent reduction. 80 per cent eliminated represents 6 per cent of consumption.

Designating Kind of Steel by Painting

The question of devising a standard method of painting the ends of bars to indicate the kind or grade of metal, was discussed by the committee and 32 Class I railroads were requested to advise whether they follow this practice; what colors are used, and what each color signifies.

Information was received from 17 railroads, all of whom use this practice to a greater or less extent. There is no uniformity of practice as to colors used to designate the same kind of bars on different roads.

The committee recommends the following color designations:

Engine bolt iron	White
Staybolt Iron	Green
Mild, soft or open hearth steel	Red
Bar iron	Brown

On account of so many different grades and brands of tool steel and welding rod being used, it has seemed impracticable to standardize color designation for this class of material.

Progress of Simplified Practice

Below is a list of commodities of interest to railroads that have been simplified to date, by the Division of Simplified Practice, U. S. Department of Commerce, the standard lists,

which may be obtained from the Department of Commerce, will be helpful as a guide to railroads who are endeavoring to simplify the same commodities so far as they are in use on their road.

Metal lath.	Vitrified paving brick.
Files and rasps.	Face brick (smooth).
Woven-wire fencing.	Face brick (rough).
Woven-wire fence packages.	Common brick.
Hot water storage tanks.	Hollow building tile.
Steel barrels and drums.	Roofing slate.
Forged tools.	Structural slates.
Steel reinforcing bars.	Sand-lime brick.
Sheet steel.	Asphalt (grades).
Eaves trough and conductor pipe.	Asbestos paper.
Terneplate.	Asbestos millboard.
Steel lockers.	Grinding wheels.
Milling cutters.	Lumber (softwood) Yard sizes and structural timbers.
Tacks and nails, sizes.	Cotton duck.
Tacks and nails, packing weights.	Builders' hardware.
Shovels, spades, and scoops.	Brass lavatory and sink traps.
Chasers for self opening die heads.	Paint and varnish brushes.

The chairman of this committee was delegated to represent Division VI at simplification conferences, held under the auspices of the U. S. Department of Commerce, when the commodities under consideration might be of interest to this division. The chairman was present at the conference on simplification of grindings wheels and thread chasers for self-opening die heads.

The number of sizes and kinds of grinding wheels was reduced from 715,000 to 255,800 and it is believed that if manufacturers of grinding machines were to standardize on the shaft fit of machines this number could be further reduced to 100,000.

A point brought out by one of the manufacturers at the conference was, that standard dies representing large production quantities are more accurately made and are subject to more rigid tests and inspection than special sizes and threads which represent comparatively small production.

Interchangeable Repair Parts

In mechanical tools and devices of different types made by the same firm, there are many repair parts that are interchangeable on two or more types of machine but the manufacturer's catalogue does not show this. It would greatly facilitate the stocking of protective repair parts if the manufacturer would indicate in his catalogue, by symbol number or description on what types of machine a given part is interchangeable, or furnish an interchangeable repair part list giving that information. It is the suggestion of the committee that if any railroads are experiencing difficulty in this respect, they may be able to find relief by endeavoring to persuade the manufacturer at fault to furnish them with the desired information. If this practice were followed up persistently by railroads in general, those manufacturers who are withholding information as to interchangeable parts of their own manufacture would be brought to realize that such practice serves neither their own best interest nor that of the consuming public.

Savings By Standardization

It is the opinion of the committee based on general knowledge and experience that a conservative figure of the savings that may be obtained would be 10 per cent of the annual amount of the purchases of the items treated. One of the railroads furnished figures on this subject which it is believed are fairly well founded and they are here given for your information. The three formulae, showing the relation between the percentage of reduction in the number of items and the percentage of saving in stock balance, storehouse space and clerical operations resulting therefrom, are derived from the experience.

(1) The value of stock balance at a given storehouse will be reduced up to 0.6 of 1 per cent for each 1 per cent reduction in the number of items carried at that point, depending upon the activity and quantity of stock carried in the items eliminated. The minimum reduction in value will be effected when the item is little used and the maximum when the quantity stocked of the item eliminated is large.

(2) Storehouse space at a given storehouse will be reduced up to 1 per cent for each 1 per cent reduction in the number of items carried at that storehouse. The maximum reduction will be obtained when the quantity stocked of the item eliminated is small and minimum when the quantity stocked is large.

(3) The cost of clerical operations attendant on material procurement and accounting at a given storehouse will be reduced up to 1 per cent for each 1 per cent reduction in the number of items carried at that storehouse. The maximum reduction will be effected when the quantity stocked of the item eliminated is large and the minimum, when the quantity stocked is small.

The elimination of a special item and the substitution of a commercial standard already in use, will be productive of reduction in purchase price and the time of delivery. No formula has been derived to show the relation of such percentage of reduction to the reduction in the number of items, but the following specific cases will illustrate the truth of the foregoing statement.

Ground joint unions, male and female of ¾-in. and 1-in. for 300-lb. pressure, were eliminated in favor of the same sizes female with a reduction in unit price of 46 per cent, and a reduction in the time of delivery 37 per cent.

Pipe couplings of ½-in. extra-heavy malleable iron were eliminated in favor of wrot line pipe couplings with a reduction in unit price of 40 per cent and a reduction in time of delivery 37 per cent.

The following figures were taken from the purchasing agent's delivery schedule of the road furnishing the information and illustrate the saving in delivery time that would be obtained by eliminating special material.

	Percentage of reduction in delivery time of standard material to that of special material
Air brake material	50
Cotters, screws, carriage and stove bolts	50
Hardware	33
Lamps (except electric)	50
Brass, copper and lead pipe	33
Fire bricks	25
Electrical material	50
Grinding wheels	50
Signal material	25

Electrical material presents a good illustration of the reduction in delivery time that may be effected by thorough standardization. A purchasing agent's delivery schedule shows that miscellaneous electrical material, to some extent standardized, can be obtained in 50 per cent less time than special material; but incandescent lamps, which have been thoroughly standardized, can be obtained in 25 per cent less time than the miscellaneous material.

Co-operation

It is the opinion of the committee that this division could progress much faster in simplification work, if the other divisions of the American Railway Association, representing the users of material, could be induced to lend the weight of their influence toward convincing their members of the benefits they may derive from the application of real standardization and simplification.

Real standardization and real simplification cannot exist so long as the railroads of the country insist on using their own peculiar standards and peculiar sizes and kinds of material regardless of what is recommended as standard practice. Real maximum benefit may be derived only by the applications of uniform standards and uniform method of simplified practice; and unless this idea can be more thoroughly applied the work done in developing and recommending standard practice will not have been productive of maximum economy.

Material Reaching Obsolescence

In the opinion of the committee, it cannot be too strongly stressed that the application of uniform standards and simplified practices among the railroads will be most effective in solving this annoying problem, since it will tend to prevent obsolescence and will do much to facilitate the sale of material becoming obsolete on a given road, either to the original manufacturer or to other roads.

Material reaching obsolescence should not be permitted to accumulate. To prevent this, when a new standard is adopted, definite decision should be made at that time as to what will be done with the material items being made obsolete. This information should be shown in the master stock book records and disseminated to all interested parties. If such items cannot be used, either in their present condition or by some modification, and are of such special nature that they cannot profitably be sold either to the original manufacturer or to some other road, they should be immediately scrapped and the depreciation charged to operation.

Effective means should be set up to prevent the ordering of any more such items. If permissible to use the existing stock of the obsolete item, the new standard items should not be ordered until such stock is liquidated and no more of the obsolete items should be purchased.

To prevent the accumulation of obsolescent material due to the equipment which it protects being retired, notations should be made in the stock book that the equipment it pro-

tects is obsolete and that no more material will be ordered so long as there is a possibility of obtaining it from stock or from dismantled equipment. The items should then be carefully policed and if any surplus develops that cannot be used in repairs, it should be scrapped rather than allowed to accumulate. The rate at which such items should be scrapped ought to be approximately in proportion to the rate of retirement of the obsolete equipment.

On account of the varying methods of financing depreciation to scrap values prevalent on the different railroads, the committee considers it inadvisable to recommend at this time any uniform methods. However, material should be disposed of by scrapping or otherwise, as it becomes obsolete and each road should provide some effective means of financing the depreciation that will take care of the obsolete material gradually as it develops. If this practice is followed, there should be no heavy depreciation charges to be provided for at any one time.

Committee: A. G. Follette, assistant chief material supervisor (Penn.), chairman; W. L. Hunker, district storekeeper (C., R. I. & P.); L. V. Hyatt, supervisor of material standardization (M. P.); J. T. Kelly, general storekeeper (C., M. & St. P.); J. P. Kavanagh, general storekeeper (C. & O.); A. N. Laret, assistant to chief purchasing officer (St. L.-S. F.); F. J. McMahon, general storekeeper (N. Y. C.—L. W.); E. H. Price, general storekeeper (N. Y., N. H. & H.); E. D. Toye, general storekeeper (C. N.—Cen. Reg.); and C. C. Kyle, general storekeeper (N. P.), chairman ex-officio.

Discussion

W. H. Merritt (B. & M.): Many roads have adopted square head machine bolts in lieu of hexagon head bolts. The Boston & Maine standard practice is to use the square head bolt for car work and the other for locomotive work. The mechanical department are quite determined in their idea of using the hex head bolt and we are called upon to maintain large stocks of both styles in the same sizes. I was wondering if Mr. Follette could tell me if much opposition had been encountered from the mechanical department of those roads where the square head bolt has been adopted as standard.

Chairman Follette: The committee did not consider this.

The Chairman: You are using the same quality of material in car bolts as in locomotive bolts?

Mr. Merritt: No.

The Chairman: You would have to have a separate kind of a bolt for each quality, would you not?

Mr. Merritt: For some uses, you would have to have engine bolt iron.

U. K. Hale (U. P.): The recommendation of the committee; that we should interest the other departments in the standardization of materials is the most important recommendation of the report, and I would like to suggest that the next committee be instructed to solicit cooperation with similar committees from the mechanical and the engineering associations and that the three committees work together on the subject of standardization.

W. R. Knauer (Penna.): We are now working along the lines suggested by the committee. During the past year we have reduced our standards about 13 per cent in a period of 11 months.

W. S. Morehead (I. C.): In connection with the paper on stationery and this committee's report, I would like to mention that the creation of an active forms committee, whose duties are to weigh carefully the advisability of new forms, would not only reduce the stationery stock but reduces the items carried. We have had for several years a forms committee representing the various departments, and we have been able to reduce our stationery item to something less than 3,000.

J. T. Goodloe (Sou.): The report refers to engine bolt iron and other materials. I would like to ask the committee in regard to tube steel, high-speed steel and similar material that has the ends painted, if they have not experienced difficulty in having the ends cut off and no other marks left on the steel. We put rings around the steel so that if the end should be cut off. It is always possible to identify the material.

Chairman Follette: That is one of the reasons among those mentioned here why tool steel was not included in the color designations. We do not feel it is necessary for tool steel to carry such identification, as its storage is somewhat different from that of other bars. We therefor did not recommend any standard method of marking tool steel.

There being no further discussion the report was adopted.

Purchase of Equipment and Large Material Contracts

G. W. Bichlmeir
Chairman

The report of the committee on uniform methods pertaining to the purchase of equipment and large material contracts and on vital statistics relating thereto has the distinction of being made the object of committee inquiry for the first time. It deals with a branch of purchasing in which the committee states $546,000,000 was expended in 1924. The value of indices of price fluctuations and business conditions in buying equipment are discussed and illustrations given of convenient methods of keeping such records with information on their use. Detailed lists have also been prepared to show what should be contained in letters of inquiry to builders for bids, of what specifications should consist, and also such items as how alternate designs and specialties should be handled. The numerous suggestions and examples given are derived from practices in use and render the committee's report one of the most valuable coming before the Convention.

Equipment purchases and large material contracts are usually made with "out of the ordinary" conditions injected, which cannot be met entirely with any hard and fast rules or any of the recommended forms. Realizing, however, that all railroad purchasing departments should follow certain fundamental principles of purchasing, your committee has endeavored to embody the broad, general principles that are applicable to all railroads alike, and is showing in some detail how these general principles may be carried out.

This committee has concerned itself principally with the question of the best methods of purchasing rolling stock, the heaviest expenditure in large contracts.

Applying 1924 figures obtained from I. C. C. Reports of new equipment installed on Class 1 Railroads and considering approximate present-day costs, we are purchasing annually in the neighborhood of

2,200	Locomotives	having a total value of	$143,000,000
2,800	Passenger cars	"	84,000,000
145,000	Freight cars	"	319,000,000
		Total value	$546,000,000

A well-regulated purchasing department should at all times be in position to estimate equipment costs sufficiently close for all practical purchases. Ways for obtaining such costs will differ depending upon the size of each road's equipment purchases, their location, etc.

A suitable and fairly accurate record of equipment costs, based on the use of either fixed or approved alternate

standards, can be maintained by roads regularly in the market for equipment at practically no cost. This can best be accomplished through a record of

1. Shop conditions of builders' plants.
2. A suitable price index.

Records of equipment purchases over a period of years are available to all, through various publications and I. C. C. annual reports, from which it is learned that, in the last 23 years the railroads of the United States and Canada purchased annually in the neighborhood of

2,600 locomotives
2,400 passenger cars
130,000 freight cars

The present-day capacity of the builder's plants exceeds the demand, and with a record of orders booked and a knowledge of what constitutes a fair average overhead and profit for construction, an idea can be readily obtained as to the attitude of the builder towards an order at any given time.

Trade publications afford a source of information as to equipment purchased weekly and monthly and a simple record as to type and successful bidder, together with total units of each class ordered to date. This should readily furnish information as to the approximate space available for new business and approximately the delivery to be expected.

The question of a suitable price index need not be as complicated as many think. The committee again stresses an important factor in connection with equipment purchases, and that is, the necessity for adhering to fixed common or approved alternate standards and in which the purchasing department must have the full cooperation of the mechanical department. With their adoption, the purchasing department should arrange proper schedules and cover through the manufacturer with a suitable form of agreement—more or less optional in form and flexible enough to avoid a hardship on the part of either buyer or seller.

A specialty is a manufactured or assembled device, patented or otherwise, that is included in the specification for equipment which is not generally made by the builders.

SAMPLE BASE SHEET TO ACCOMPANY BUILDER'S INQUIRY

NORTH & SOUTH RAILROAD

Forming a part of Bid dated.....

Submitted by.....

Column 1—Base Specialties, used in computing Car Builder's Base Price.
Column 2—Alternate Specialties, used in computing Car Builder's Alternate Price.
Column 3—Car Builder's Net Addition or Deduction per car if Alternate Specialties are applied.

SPECIALTIES	COLUMN 1 Base Specialty	COLUMN 2 Alternate Specialty	COLUMN 3 Car Builder's Net Addition or Deduction per car for Alternate Specialties	
	Schedule-Drawing, etc.	Schedule-Drawing, etc.	Addition	Deduction
Brake Beams ABC Equipment Co..... XYZ Brake Beam Co.....	Drawing C-3100	..... Drawing C-3191	... ...	....
Brake Beam Hangers Railroad Design..... Smith Mfg. Co.....	Drawing B-6940	..... Drawing B-8760	....	....
Carlines Railroad Design..... ABC Equipment Co..... XYZ Equipment Co..... Smith Mfg. Co.....	Drawing C-6380	..... Drawing C-9760 Drawing C-8545 Drawing C-7260	....	....
Etc. Etc				
Etc. Etc				

A Suggested Method of Reporting Base Specialties When Submitting Inquiry for Bids on Equipment

An allowance is a term commonly used to designate the amount of money included in the bid submitted by equipment builders, or manufacturers, at which they are able to make or purchase a given device or portion of work for which it may be asked, and which amount they will deduct from their bid if it is furnished by the purchaser. The practice has become a necessity in large contracts, chiefly to confine trading to the maker or distributor of patented devices and the ultimate consumer.

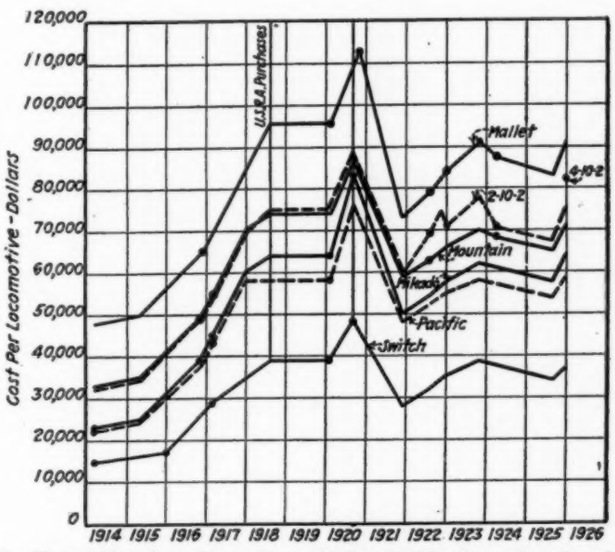
The term alternate is merely the optional price at which a different device or feature of construction not included in the specification may be considered. Alternates should not be asked for devices commonly known to be interchangeable and where there will be no change in construction or method of application, as needless computations on part of builders and purchaser, with attendant delay in purchasing agents' offices can be thus avoided.

With an understanding of close costs of specialties, which usually cover a fairly large percentage of equipment costs, no large differences should exist between estimated and initial or final bids from builders.

In the event that no agreement prices are available on specialties and to obtain an idea of the general trend of prices of all items entering into the construction of any particular equipment, these can be measured closely through running records of conditions affecting the various industries and basic costs.

There are numerous price indexes published daily, weekly and monthly, which serve as a guide to commodity prices as a whole, in which we refer to weekly composite prices of finished steel—pig iron—wholesale prices—the latter based on the average movement of wholesale prices of 200 representative commodities, lumber prices, etc.

These records are invaluable to the purchasing department, particularly to the larger lines which have occasion to enter the equipment market each year or oftener, and, wherever



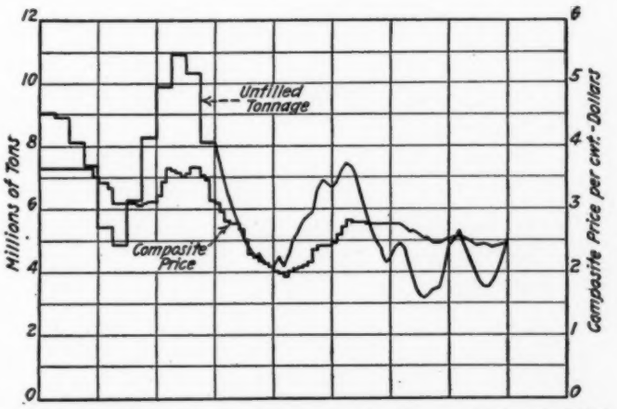
A Chart Showing How One Railroad Watches Trends of Locomotive Costs, Comprising Builder, Specialty, Messenger, Setting Up and Contingency Costs, Plus Freight to Missouri River

possible, should be kept as a guide to all purchases, equipment or otherwise.

This applies also to well-kept records of all important past purchases, requiring but little time in the making and invaluable for comparisons in the future, ofttimes affording sound arguments to the purchasing agents in their final negotiations.

The committee is of the opinion that the general trend of conditions is best reflected in graphic form and, it is desirable to chart equipment costs in the same manner. This can best be accomplished by selecting a particular type of each class, using it as a guide to costs of other types—proper differentials being established through a search of records of costs over a period of years, taking into consideration, of course, changes in standards peculiar to each road in each class of equipment.

A price chart on box cars is shown, with approximate dif-



A Graphic Chart of the U. S. Steel Corporation's Unfilled Tonnage, and the Composite Finished Steel Price over Several Years

ferentials for other types peculiar to the particular road furnishing this chart. Passenger car charts can be arranged along the same lines—Locomotive charts by type, as well as on a per pound basis.

These equipment charts shou'd include all costs in connec-

tion with any equipment purchase, i. e., contingency—inspection—delivery costs, etc.

The purchasing department is concerned with three problems in negotiating the purchase of equipment, namely: (1) a clear-cut inquiry; (2) a concise tabulation of bids; (3) a definite order.

Your committee feels this can best be accomplished by adherence to the following:

Inquiry

The purpose of the inquiry is, of course, to set before the bidder a clear statement of what is wanted and in which a suitable base must be agreed upon. The inquiry should make reference to the following:

Specifications—Locomotive

Locomotive specifications should be numbered and reference made to type and class of locomotive and if arranged for oil or coal burning. The specifications should be dated and if revised, date of revision shown, all correspondence always making reference to the latest revision date, if any.

If separate specifications are issued for the tender, they should be numbered, dated and reference made to the capacity,

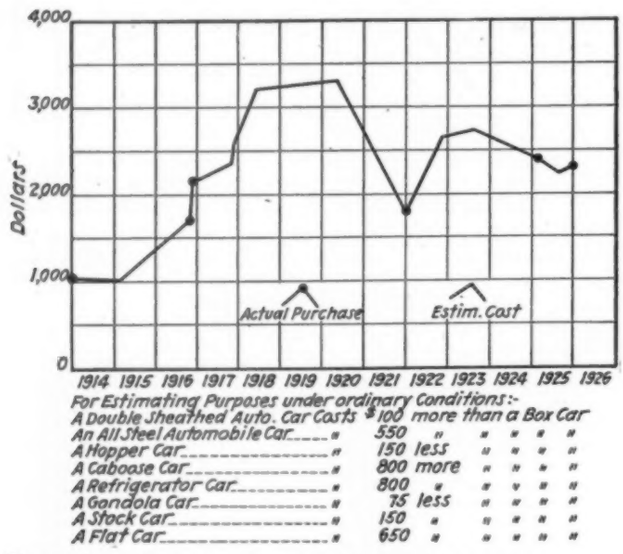

4,000
3,000
2,000
1,000
0
Dollars
Actual Purchase
Estim. Cost
1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926
For Estimating Purposes under ordinary Conditions:-
A Double Sheathed Auto. Car Costs $100 more than a Box Car
An All Steel Automobile Car " 550 " " " " "
A Hopper Car " 150 less " " " "
A Caboose Car " 800 more " " " "
A Refrigerator Car " 800 " " " " "
A Gondola Car " 75 less " " " "
A Stock Car " 150 " " " " "
A Flat Car " 650 " " " " "

Chart of the Cost of a 40-ft. Double Sheathed Box Car of 50 Tons, with Differentials to Aid in Determining Costs of Equipment

type and truck, i. e., 12,000-gal. cylindrical, 4-wheel truck, etc.

A general description should be shown under the following headings:

General dimensions,
Weights of locomotive,
Method for obtaining weights,
Tractive power,
Heating,
Ratios.

This general description should be followed with general specifications making reference to the following:

Numerical index of drawings and material specifications, as well as schedules, showing what if any, specialty items the railroad will furnish; also

Inspection,
Material and workmanship,
Patents,
Painting and lettering,
Castings,
Marking axles, tires, etc.,
Numbering wheels,
Piping,
Lagging,
Detail boiler specifications,
Detail frame specifications,
Detail fixture specifications,
Detail machinery specifications,
Detail engine truck specifications,
Detail tender truck specifications,
General description of tender,
Brake system,
Draft gear,
Tank and fixtures,
Accessories.

There should also be included any additional information of value to the builder to enable him to render a bid with a perfect understanding of what is wanted without undue delay.

Specifications—Passenger Cars

Passenger car specifications should be numbered and reference made to type and class of car and if no separate specifications are issued for the trucks, the reference should include these with advice if four or six-wheel. The specifications should be dated and if revised, date of revision shown, all correspondence relating thereto always making reference to the latest revision date, if any.

A general description should be shown under the following headings: Dimensions and Weights.

This general description should be followed with general specifications making reference to the following:

Numerical index of drawings and material specifications, as well as schedules, if any, showing what, if any, specialty items the railroad will furnish; also

Inspection,
Material and workmanship,
Patents,
Painting, lettering and numbering,
Castings.

These should be followed with detail specifications covering:

Trucks,
Brake system,
Platform and draft gear,
Underframe,
Vestibule,
Side and end framing,
Roof,
Inside finish, general,
Heating apparatus,
Lighting system,
Car trimmings.

There should be given any additional information of value to the builder to enable him to render a bid with a perfect understanding of what is wanted and without undue delay.

Specifications—Freight Cars

Freight car specifications should be numbered and reference made to type, class and capacity of car. The specifications should be dated and if revised, date of revision shown, all correspondence relating thereto always making reference to the latest revision date, if there be any.

A general description should be shown under the heading—Dimensions.

This general description should be followed with general specifications making reference to the following:

Numerical index of drawings and material specifications, as well as schedules, if any, showing what, if any, specialty items the railroad will furnish; also

Inspection,
Material and workmanship,
Patents,
Painting, lettering and numbering,
Castings,
Lumber,
Trucks,
Guarantee and weights for wheels,
Brake system,
Underframe,
Draft gear,
Superstructure,
Doors.

There should be given any additional information of value to the builder to enable him to render a bid with a perfect understanding of what is wanted and without undue delay.

General

All specifications should be arranged so that they show in detail, under proper subject-headings, acceptable items, and should be sufficiently broad to permit proper competition.

The purchasing department should cooperate closely with the mechanical department in the preparation of specifications, schedules, etc., preserving common standards, but at the same time making provision for suitable alternates wherever possible.

Such alternates as are acceptable should be developed prior to the time, the railroad is actively in the market, avoiding much confusion, delay, and jeopardizing of prices by introducing last-moment alternates.

The inquiry should list the specialties, the application of which is to be considered by the builder in making a base price.

The inquiry should state if it is the intention of the railroad to purchase direct and deliver free of charges to the successful

bidder the specialties referred to, or if the builder is to purchase them and include in the base bid.

If the builder is to purchase the specialties, he should be requested to submit a statement with his bid showing the prices at which the specialties have been included, so that the purchasing agent may check these prices with allowances named by the specialty manufacturer.

The inquiry should list alternate specialties which the railroad will consider, making reference to the manufacturer, railroad drawings, specifications or schedules, if any are applicable, with a request that an addition or deduction figure be named if the railroad elects to specify any of them, with the understanding that specialty additions or deductions are based on car builders furnishing all material and labor necessary to apply the various specialties. There is a tendency on the part of many to issue extensive lists of alternate specialties, many of which afford little or no competition—items of standard design and price, made under license agreements, etc.—but which cause much delay to the builders corresponding with the specialty manufacturers for prices, application drawings, etc., and in turn transmitting them to the proper departments for making up their estimates.

Much delay can be saved if the railroad, when issuing an inquiry to the builders, will promptly advise the specialty manufacturers their particular specialty is being considered, furnishing them with a list of the builders who will bid, with request that they be furnished promptly any and all information necessary for prompt rendering of builders' bids.

A request should be made to the builder that he attach to his bid a memoranda, reciting his interpretation of points he does not think are clear in the specifications and drawings.

A closing date for tabulations and consideration of bids should be given in the inquiry, allowing sufficient time for accurate estimates on the part of the builder, all dependent upon current market conditions, with advice that the bidders will be notified as to the time a personal conference has been arranged for, thus avoiding the builders' sales expense usually following the issuance of an equipment inquiry, and which expense in the final analysis must be borne by the railroads as a whole.

Much confusion and expense can be avoided if advice is given the car or locomotive builders and specialty companies that conference will be afforded prior to closing any lot of equipment, and that as near as possible conference dates will be arranged after a careful study of all propositions received.

The bidder should be requested to advise conservatively what delivery can be arranged, i. e., delivery to start, rate per day, delivery to be completed, etc., etc.

Tabulation

Dependent upon the clearness of the inquiry depends the shape the bids are received in and, with a proper base, the final costs can readily and accurately be arrived at, and which should cover the following:

1. Name of bidder.
2. Location of builder's plant.
3. Builder's base bid.
4. Cost of specialties delivered to builder's plant.—If the railroad furnishes them.
5. Credit account specialty allowances from manufacturers.—If builder furnishes and includes cost in base bid.
6. Contingencies.—A sufficient item to care for changes during construction.
7. Inspection cost.—To cover cost of inspection of specialties, as well as equipment, as builder's plant.
8. Setting-up and messenger charges.—For locomotives only.
9. Freight on complete unit to closest junction of purchasing railroad.
10. Cost of car or locomotive complete, delivered to closest junction of purchasing railroad.
11. Time of delivery and rate per day or week.

Orders

Having negotiated with all bidders their best possible propositions, and having decided on the most attractive combination of specialties, the purchase should be covered with a form of order or contract meeting the requirements of both parties and should embody:

1. Reference to inquiry, bids and conferences, together with a complete description of the equipment being ordered, making full reference to drawings, specifications, schedules, material specifications, etc.
2. Price per unit and f. o. b. point.
3. Delivery agreed upon.
4. Consignment.
5. Lettering and numbering of equipment and wheel numbers.
6. Inspection.—A clause similar to the following is suggested:

"It is understood that.....will have charge of all matters pertaining to inspection and workmanship in connection with the equipment covered by this order and all communications in regard to such matters should be mailed to him direct. Material or equipment covered by this order must not be shipped until released by.....or authorized representative."

7. Ordering, delivering and marking of specialties.—If ordered by the railroad company.—A clause similar to the following is suggested:

We will arrange to place orders at once with the manufacturers of articles which the railroad company is to furnish free of all charges, delivered to your plant, for the above mentioned equipment, of which the following is a list:

....
....

Please advise promptly the name of your officer to whom copies of our orders for these specialties should be sent and what markings shall apply.

It is understood that you will have these orders checked to see that the proper type of material has been ordered and in sufficient quantities to cover all equipment on this order, to the end that it may be definitely known that the material we will furnish, together with what you will furnish, will constitute a complete unit, as mentioned in the order.

Specialty manufacturers have been instructed to prepay all freight charges to your plant, from point of shipment, and in cases where this is not done, please arrange to pay such charges, advising us promptly with supporting papers covering freight charges paid by you.

8. Storage and care of railroad company material.—If ordered by the railroad company.—A clause similar to the following is suggested:

It is understood you will receive all materials furnished by the railroad company, keeping an actual record of same and providing storage space at your plant, keeping materials in such places as will prevent deterioration, theft or damage. It is further understood you are to be responsible for damage to railroad company's material while at your plant and any materials which have been damaged or lost in your plant and which will have to be replaced to complete this order, you are authorized to take up direct with the specialty manufacturers the matter of replacement, advising this office when you do so.

9. Insurance.—On material at builder's plant if ordered by the railroad company.—A suitable clause approved by the individual road's legal or contract department should be provided.
10. Liability.—Account accidents, liens, transfers of contract, etc.—A suitable clause approved by the individual road's legal or contract department should be provided.
11. Patent and royalty claims.—A suitable clause approved by the individual road's legal or contract department should be provided.
12. Safety appliances.—A clause similar to the following is suggested:

"It is understood that the price named includes all safety appliances in accordance with the Interstate Commerce Commission Order, dated March 13, 1911, and supplements thereto; also includes proper location of couplers above rail and any other attachments or arrangements which may be required to make this equipment acceptable to the road receiving the same for shipment."

13. Weighing of locomotives or light weight of cars.—As agreed upon in the specifications.
14. Ownership or trust plates.—As agreed upon.
15. Lumber—for use of lumber-producing roads when ordering cars.—A suitable clause approved by the individual road's traffic department.
16. Messenger service.—As agreed upon.
17. Terms of payment.—As agreed upon.
18. Invoices.—How to be rendered.
19. Routing.—Give instructions as to traffic officers they shall call upon for routing.
20. Photographs.—Give requirements as to size and number.

The recommended order or contract clauses should, of course, be worded to suit the particular transaction in hand—these merely suggested as a step towards proper protection of the railroad's interest, whether it be a form of order or contract offered by the buyer or seller.

Committee: C. W. Bichlmeir, chairman; general purchasing agent (U. P.); W. C. Bower, manager, purchases and stores (N. Y. C. L.); C. B. Hall, general storekeeper (Penn.); A. A. Taylor, assistant to general purchasing agent (M. P.); G. H. Walder, purchasing agent (C., M. & St. P.); E. W. Walther, assistant to purchasing agent (B. & O.); and G. E. Scott, chairman ex-officio, purchasing agent (M.-K.-T.).

Discussion

W. F. Munster (B. & M.): I would like to have Mr. Bichlmeir give the views of the committee as to the question of allowances or rebates on specialties. Of course we are all up against that same proposition. Has the question of the necessity for the specialty people giving the car builders one price and then giving the railroads a lower price been considered?

Chairman Bichlmeir: That has been discussed. Our own experience has been that we are the gainer through buying these specialties ourselves. Some four or five months ago the question was raised in connection with a meeting we had with car builders. They favored a uniform price on all specialties, which we finally decided was not practical. The tendency is to raise the cost of equipment in that the specialty costs furnished to the car builders are fictitious and naturally we pay a profit on the cost of the entire car or locomotive. Assuming that the profit is 10 per cent and the average cost of specialties for a locomotive will be $20,000, you can readily see what we pay in the way of a profit to the builder, based, as I say, on fictitious costs. I imagine that for the purchase of a modern freight car it will average $100 a car, and for a locomotive probably $1,500.

S. Porcher (Penna.): Perhaps the reason we have not heard more on this subject is that not all purchasing agents have to do with the purchasing of equipment. This report seems to be as good a text on the subject as could be written, and no purchasing agent will make a mistake in taking this and using it as a guide for his work.

C. D. S. Baldwin (Bangor and Aroostook): I am glad to know how the larger roads handle this rather perplexing problem. I want to thank the committee for the careful way in which the details are arranged. If we are in doubt as to the best way to handle this work we have it in the report as a constant guide for reference.

There being no further discussion the report was adopted and the committee excused with the thanks of the association.

Reclamation and Handling of Scrap

C. J. Mackie
Chairman

The interest that is taken in scrap handling and reclamation practices is evident by the large number of facilities that have been launched exclusively for this work in the last two years and by the substantial investments which have been made in equipment for them. The explanation of this lies in the large revenue that is directly available from the sale of scrap (exceeding a half a million dollars annually on many roads), also the reductions in purchasing that are afforded by processes of salvage. Enterprise in this direction, however, is still in a formative state with a surprising large number of problems of facilities, methods and policy pressing for solution. Because of this the subject of scrap handling and reclamation has been a live topic of discussion in the association each year. This year's committee, under the leadership of C. J. Mackie, who supervises one of the largest and most enterprising scrap operations in the country, and under the guidance of C. B. Tobey, the committee chairman of preceding years, has enlarged upon the information on this subject with a discussion, among other things, of the economic considerations of scrap operations and also with detailed descriptions of a few reclamation practices which have proved successful.

Your committee desires to draw attention to the fact that the entire purpose of scrap handling and reclamation operations on railroads is to reduce costs and increase profits. No scrap handling or reclamation operation should be accepted as regular practice until it is definitely known that the net return from each operation leaves sufficient margin of profit to justify the effort and expense.

Therefore, careful cost study should be made of each scrap handling and reclamation practice, in order that it may be definitely known that the practice is profitable. These cost studies should be kept as a part of the records to which reference can be made at any time, and which can be rechecked and revised from time to time as conditions change.

Education.—Your committee strongly recommends consideration of a program of continued education to interest employes to save and not waste materials and supplies. The very best form of reclamation is a practice of conservation that will insure materials being continued in service, and not thrown into the scrap pile, until they have outlived their usefulness.

Visitation.—Attention is directed to the substantial benefits that result from friendly visitation between representatives of the various railroads and the exchange of ideas relative to scrap handling and reclamation practices.

Scrap Handling

Financial Returns from efficient methods for unloading, sorting, stripping and improving lower grades of scrap to the higher selling grades; storing and loading of scrap, compare very favorably with the profits derived from reclamation. In fact, better handling of scrap will greatly increase the volume of material available for reclamation.

Typical Steps in Scrapping Cars—A 50-ton Composite Car Being Lifted from Trucks at Scrap Plant

The increased returns from grading of scrap, together with the increased volume of material made available for reclamation purposes, amply justify the practice of selling no scrap that is unsorted.

Scrap sorting tables very materially lower the cost of sorting scrap. Tables should be portable, with the platform waist high, with a loose plank top, and an area of table sufficiently large to contain enough scrap to keep a sorting gang employed for a full day. The sorting table relieves sorters from constant bending, as is the case when scrap is placed on ground or floor of dock. Sorters gradually work toward the center of the table, removing loose planking as they proceed, and permitting No. 2 fine wrot scrap to drop down where it can be loaded out for shipment by magnet.

Metal containers of three or four tons capacity are found economical for accumulating materials for movment to reclamation plants, and also for handling graded scrap from shears, where the payment for output is on a tonnage basis.

It is recommended that supervisors in charge of scrap plants be given lists of prices for the various classes of scrap as soon as the scrap is sold each month. This information will greatly assist in sorting and improving scrap for sale along the most profitable lines.

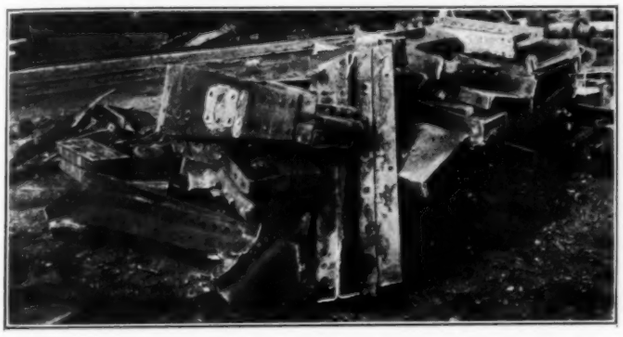
To illustrate: The spread between selling price of No. 1 and No. 2 cast steel this month may justify the expense of cutting No. 2 cast steel to make No. 1 cast steel; while the following month the spread between the two prices might not justify the additional expense involved.

Where the volume of scrap accumulated is sufficiently large, it is suggested that all scrap should be prepared ready for use by the consumer before it is sold. The following operations can be performed at a substantial profit:

Scrap locomotive boilers, scrap rail, scrap car sides, uncut structural scrap, scrap underframes from wornout cars, converted into No. 1 Heavy Melting steel with cutting torch, power shear, rivet cutting gun and breaking device.

Scrap cast steel bolsters, and other No. 2 cast steel scrap, converted into No. 1 cast steel scrap with cutting torch and breaking device.

Bent and twisted pipe and boiler tubes converted into No. 1



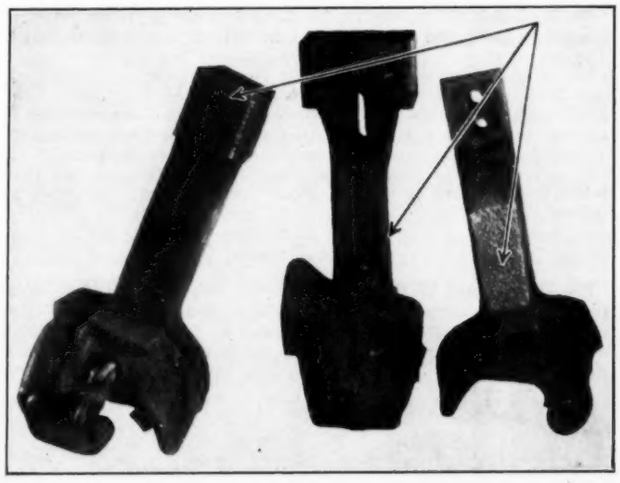
Typical Steps in Scrapping Cars—The Underframe Cut into Heavy Melting Steel

busheling scrap and straight pieces salvaged for sale as No. 1 flues and pipe, or for the manufacture of fence posts, and scrap sheet steel, converted into No. 1 busheling scrap through the use of high speed power shears.

Replies to a questionnaire indicate that various railroads are using similar methods in reporting, selling and shipping scrap and collecting payment therefor. It was developed that, with the exception of scrap rail, apparently most scrap is sold on net ton basis, scrap rail being sold on a gross ton basis.

It is suggested, in the interest of uniformity, that arrangements be made to handle all sales of scrap, including rail, on the basis of net tons. It is also suggested that in sending out inquiries for bids on scrap, the location of scrap be omitted, on account of the tendency of bidders to take advantage of their geographical location when bidding on scrap offered for sale, when the point at which scrap offered for sale is known.

Your committee was instructed to look into the practice on some railroads to sell wornout freight cars to salvage dealers. It is suggested that, before arrangements of this nature are made, the entire matter be carefully analyzed to insure that it is not more profitable to dismantle these wornout cars in connection with our scrap and reclamation operations, disposing of the scrap parts in the most profitable manner, and saving for further service those parts that are in demand and which can be profitably restored to



Reclamation Processes on the Burlington—Electric Welding of Couplers. In center, Coupler with Worn Shank. On right, Same Coupler Restored. On left, Coupler with Shim Welded on Butt

serviceable condition, in preference to selling these cars complete on wheels to salvage companies.

Uniform Scrap Iron and Steel Classification

During 1923 it was suggested to the Bureau of Standards of the United States Government at Washington that, if possible, a master scrap classification be developed to govern the producers and consumers of iron and steel scrap throughout the country. Three general conferences have been held, at which all parties interested, including the American Railway Association, Division VI, were represented and tentative specifications covering iron and steel scrap were adopted.

Your committee has carefully studied this new classification and does not recommend any change in our standard practice of classifying railroad scrap for sale at this time.

Your committee does not recommend the adoption of the proposed standard contract form for the purchase of scrap, as promulgated by the United States Department of Commerce, Bureau of Standards, early this year, as it does not conform to the present practice on most of our railroads with regard to terms of sale in the matter of buyer's weight and inspection, claim clause and provision for purchase contract.

Typical Steps in Scrapping Cars—The Steel Underframe Ready for Cutting

Reclamation

The forms of recovery and reclamation of material from scrap are three-phase, i. e.,

(a) Recovery requiring no labor other than storing and inspection to make it available for further service;

(b) Reclamation requiring labor other than sorting and inspection to recondition it for further service;

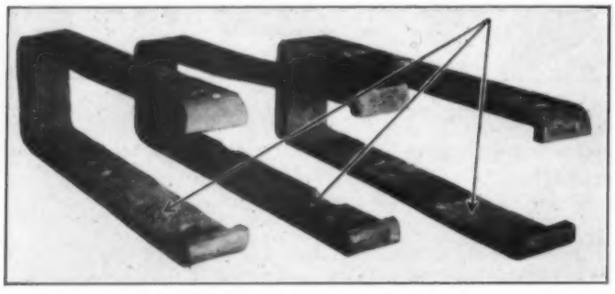
(c) Reclamation where the material recovered from scrap is changed in form and utilized in the manufacture or reconditioning of other articles.

No reclaimed materials should be furnished for use until they have been inspected and accepted for the service intended, by the using department, or the authorized inspection department, as nothing will more rapidly discredit reclamation than to attempt to furnish materials that do not meet required specifications.

It was suggested that a few successful reclamation practices should be set forth in detail. Four operations are described as follows:

Brake Beams

Equipment and Method: A dissecting table 4 ft. x 10 ft. constructed from scrap angle iron and equipped with two 4½ h.p. reversible air motors, 650 r.p.m. geared to 50 r.p.m. under load. Motors are equipped with socket wrenches which can be easily slipped on and off, making it adaptable for any size or style of



Reclamation Processes on the Burlington—Yoke Recovery. In center, Yoke with Worn Spots. On right and left, Yokes Restored

nut up to 1½ in. All beams are dissected on this table and bent and twisted tension and compression members are sent to the furnace and bulldozer for heating and straightening.

An oil furnace with a chamber 2 ft. x 3 ft. x 6 ft.

An air bulldozer for straightening tension and compression members.

An assembling table constructed from scrap angle iron and equipped with air clamp for holding beam in place and two reversible air motors 125 r.p.m. The motors are at each end of beams so both nuts may be tightened at the same time. Fulcrums and heads are applied to compression member and nuts are started by hand on the tension member, but all tightening of nuts is done by air.

A rod bending machine consisting of an air bulldozer equipped with dies for bending tension members to the proper contour.

A testing machine arranged with an air cylinder and fulcrum for giving all beams the A. R. A. set load test.

A testing machine arranged with an air motor and screw and scale arrangement with a gage for measuring deflection and permanent set in accordance with A. R. A. rules. One beam out of a day's run or one out of each 500 are tested on this machine.

Cost Analysis: The cost of 54,581 brake beams reclaimed year 1925 was as follows:

Labor	$ 21,188.52
New parts	105,462.31
Interest, depreciation and tax on plant	2,858.57
Repairs to plant	4,148.62
Fuel and miscellaneous supplies	3,794.39
Power	602.73
Scrap value of old parts used	24,617.55
	$162,672.69

Couplers

Equipment: Oil furnace, hydraulic press, electric welding outfit, and oil annealing furnace with pyrometer.

Method: Couplers with bent shanks are heated in oil furnace, straightened in hydraulic press, templet being used to determine when shank is perfectly straight. When side of shank of coupler has worn from chafing, worn places are built up with electric arc. Couplers built up in this manner are afterward annealed in oil furnace. Couplers are then fitted with knuckles, locks and other parts, carefully gaged and inspected.

Cost Analysis: Following is the representative cost analysis to reclaim 100 couplers where 4836 couplers were reclaimed in 1925:

Direct labor and percent of overhead expense	$ 98.68
Cost of new materials plus handling cost	182.92
Total labor and material costs including percentages	$281.60

Switch Stands

Equipment: Oxy-acetylene cutting and welding equipment, electric welding equipment, 16-inch lathe, drill press, annealing furnace, paint spray.

Method: Switch stands of all types are completely dismantled, part of dismantling work done with oxy-acetylene torch, while worn parts are restored by welding. Cast iron parts are built up with electric arc and then annealed in annealing furnace to facilitate matching. Cranks and masts are built up with oxy-acetylene. Parts are then turned down to desired size on lathe. In ground throw switch stands, the two sections of the body are bolted together and reamed to size on drill press. When parts have all been properly conditioned, the stand is assembled for service. No switch stands are shipped out until they have been inspected and accepted by the engineering department.

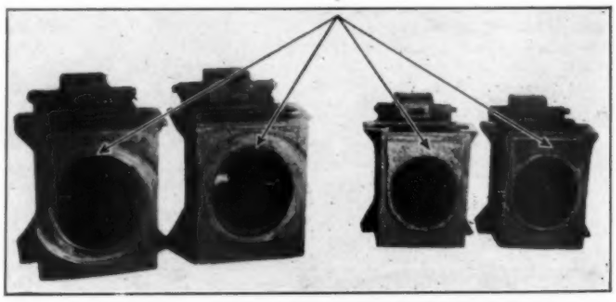
Cost Analysis: Following is a representative cost study on 100 ground throw switch stands, where 1026 switch stands were reclaimed in 1925:

Direct labor and percent of overhead expense	$140.00
Cost of new materials plus handling cost	73.10
Total labor and material costs including percentages	$213.10

Train Line Angle Cocks

Equipment: 6-spindle vertical valve grinding machine lathe equipped with special pneumatic chuck for reaming worn threaded ends, rethreading and applying face bushing in successive operations; electric welding outfit, air testing facilities, and paint spray.

Method: Cocks to be reclaimed are cleaned in a rumbler, and then inspected for condition of threaded ends, where attached to train line and air brake hose. If threads are bad, handle is removed, bad end reamed and rethreaded and 1½ x 1¼ in. face bushing applied, bushing being spot welded in place with electric arc to remove any danger of it coming out when air brake hose is



Reclamation Processes on the Burlington—Journal Boxes Before and After Restoration

changed. Cocks are then completely stripped, the taper valve being kept with body from which removed, as it is found much easier to get satisfactory results when this practice is followed. Valves are then reground into the bodies on a 6-spindle vertical grinding machine, a very fine grinding compound being used. Cocks then reassembled and tested under air pressure, each cock being submerged in water to detect smallest leak. Handles then applied and cocks retested, after which dust protector caps are applied to threaded ends. When taper valve or key is worn beyond further service, it is replaced with a new valve.

Cost Analysis: Following is a representative cost study on 500 train line angle cocks where 11,792 train line angle cocks were reclaimed during year 1925:

Direct labor and percent of overhead expense	$123.75
Cost of new materials plus handling cost	77.87
Total labor and material costs, including percentages	$201.62

Committee: C. J. Mackie, storekeeper (C., B. & Q.), (chairman); B. T. Adams, assistant general storekeeper (I. C.); G. W. Alexander, general storekeeper (C. of G.); E. J. Becker, general

inspector of stores (S. P.); I. C. Bon, superintendent of reclamation (Wab.); W. J. Diehl, purchasing agent (M. & O.); C. H. Hoinville, assistant to general purchasing agent (A. T. & S. F.); C. H. Lammers. chief material inspector (C. & E. I.); G. W. Lieber, superintendent of reclamation (M.-K.T.); W. H. Morris, assistant general storekeeper (Reading); E. W. Peterson, general storekeeper (Bangor & Aroostook); A. L. Prentice, Supervisor of scrap and reclamation (N. Y. C.); E. J. Remensnyder, assistant to purchasing agent (Penn.), and C. B. Tobey, general storekeeper (L. V.), (chairman ex-officio).

Discussion

The report was illustrated with slides and motion pictures.

Chairman Mackie (in presenting the report): Particular attention is called to the paragraph "The Cost of Reclamation," and what we say about reclamation in this paragraph should also be applied to scap handling, unless we know the cost of scrap sorting or as well as the cost of a particular reclamation operation, we cannot tell whether the operation is done at a profit or a lose. It is of vital importance that all costs of material and labor entering into the reclamation of any article be carefully obtained in order to determine whether or not the practice is profitable.

We also want to emphasize the importance of reclaiming materials in a way that will result in their being used willingly and glady by the consuming departments, and we therefore urge that before any reclamation operation is adopted, that the process be thoroughly tested and accepted by the authorized inspection department.

J. G. Stuart (C. B. & Q.): I move the adoption of the report.

The motion was seconded.

J. T. Goodloe (Sou.): Did the committee get any information as to the price of material that is taken back into the accounts where there is no labor charge?

Chairman Mackie: Yes, and there is no uniform practice. Some take it in at the corresponding price of new material, and some at a reduced figure.

S. J. Trudeau (B. & M.): It has been suggested that the location of scrap be omitted. I would like to know why that was done.

Chairman Mackie: We felt that in reporting scrap for sale by location, you would have something like the experience that some railroads have had in purchasing ice in the winter season. It was found that in purchasing ice, the man who had an ice field adjacent to the house where you were going to store natural ice took advantage of his location and increased his bid accordingly, feeling that you would rather pay him the higher price than stand the cost of transportation from a more remote field with a lower initial quotation.

Mr. Trudeau: That doesn't apply on our railroad. We have to consider our freight revenue earnings as well. We ship to approximately 100 different points over a period of a year, and we consider our earnings as well as the prices we receive f. o. b. point of shipment. There are no scrap mills on our line.

D. H. Reed (Sou.): What grade of material and thickness of metal are suitable for constructing containers for three and four-ton capacity handling?

Chairman Mackie: The practice generally followed is to take boiler shells of scrap boilers and cut them in two. They make a satisfactory container.

Mr. Reed: Is not a weight of three and four tons too heavy?

Chairman Mackie: We handle not only three and four, but five, six, and seven ton boiler shells. Of course we would not make a container out of an old shell that was badly rusted. We examine its condition before selecting it for that purpose.

J. W. Gerber (Sou.): It was not so much about the make of the container that Mr. Reed asked. It was the question of handling the material of that weight with a crane. The question was handling three or four tons with a movable crane.

Chairman Mackie: With a yard crane—I presume you mean a locomotive type crane—it would depend a good deal on the radius of the boom. The particular work referred to was handled with a gantry type crane with a 15-ton capacity hoist.

There being no further discussion the motion to adopt the report was put to a vote and carried.

Importance and Possibilities of Reclamation

By G. W. Lieber

Superintendent of Reclamation, Missouri, Kansas, Texas

Subjects of various kinds have received the attention of railroad officials for many years, especially subjects pertaining to and leading up to the economical operation of railroads of this country.

Purchasing, storing and distributing the material and supplies required by every department is an undertaking of large magnitude on any railroad; therefore, the purchasing and stores department stands out as one of the most important departments for economy.

As the custodians of all unapplied material and supplies the activities of this department are not confined to new materials, but embrace the reconditioning or reclaiming of old materials and the final disposition, as scrap, of materials which cannot be made to serve a further purpose without prohibitive expense.

While the reclamation of materials has been actively followed by a few railroads for a number of years, it is only during more recent years that the magnitude of the work and the possibilities for saving have been generally considered, with the result that today this is one of the live questions on most of our railroads.

Reclamation of material and supplies can only be made successful where careful supervision is exercised both as to the cost of reconditioning items, as compared with the purchase price of similar new items, and a definite control of the output of such organizations to insure the reclamation of only needed materials and in quantities commensurate with the immediate needs.

Cost should always be considered with respect to the service to be derived after the article is reclaimed. Actual cost of reclamation might justify an operation, but service of reclaimed articles, as compared with new, might make the practice unprofitable in the end. It is, therefore, necessary that service to be derived after reclamation be given the utmost consideration in order to determine the advisability of such operations.

The output of a reclamation plant represents a return to stock of usable materials to the same extent as a purchase of new material and there should be no justification for permitting excessive or doubtful recovery of materials beyond reasonable requirements.

The items to be reclaimed and the quantity of each should receive as careful consideration as is accorded materials for purchase in the open market.

Frequent Analysis Important

While a well organized and properly operated and supervised reclamation plant will reflect a saving to the railroad, it will only function to the best advantage when its activities are carefully analyzed each month, and only such operations continued as reflect a real saving and then only in quantities to protect current needs.

Opinions vary as to the proper definition of reclamation, some claiming there should be a distinction as between conservation, repair, reclamation and manufacture.

A recent committee defined the various operations as follows:

Conservation—constitutes the recovery of material which could be returned to stock without requiring any mechanical labor.

Reclamation and repair—covers material reconditioned by mechanical or other labor and re-used for its original purpose.

Manufacture—covers material recovered and made into some other useful article.

A great many articles are being handled through the reclamation departments today, therefore, attention should be concentrated on the most important articles to all concerned with a view of recommending the most practical and profitable methods of reclamation work. Certain reclamation practices or processes may be suitable to an eastern and not to a western road.

Cost Analysis

There is a variation of opinion as to the items involved in estimating cost, due to the fact that abandoned or shop made machinery is used, or the buildings constructed of old material. Still, they represent an item of cost as well as supervision, fuel, light, water, depreciation, insurances, taxes and all items generally included in overhead expense. These items are necessary to the plant's operation and to its output and should be included in estimating cost as well as the actual labor and material. If this method of cost is followed, it will be found that some operations are not so profitable from a reclamation standpoint. There is no question but that a large number of articles can be reclaimed at a saving.

New developments in reclamation work are obtained by those interested, by visiting and studying what others are doing with certain articles and the kind of equipment used. It will often be found that where a certain process is profitable, the equipment used is the up to date. Advanced methods and machinery are very essential to reclamation work in order that the operation may be put on a production basis where consumption warrants.

Welding has developed profitable reclamation work and has returned to service many articles beyond repair by any other process. It is important that proper welding equipment be installed and operated by efficient workmen. The effectiveness of welding is largely due to the operator, therefore, it is essential that he have some knowledge of metallurgy and experience in fusing points of various metals. Too little attention has been given welding with the result that failures have occurred and methods have been condemned, although the failure was not the result of the methods or process used.

Reclamation as a whole is rapidly advancing due to the fact that it is one of the principal means of reducing the operating costs of our transportation systems and the material growth of this particular department in the past few years signifies the importance that is being attached to its activities.

Facilities for Handling Materials

E. H. Polk
Chairman

Division VI of the A. R. A., has given much attention in past years to consideration of better facilities for handling material with the result that much information is now contained in its proceedings on questions of type, arrangement and location of equipment for such purposes. This year's committee has elaborated on previous reports with further discussions of such questions as the proper types of platforms, the need of ventilation, arrangement of lighting, etc., but the text matter of its report is directed principally to a description of various methods which have been evolved for storing material in and around store buildings. The report as a whole, however, is distinctive for the use made of motion pictures and slides with which to illustrate outstanding developments which have taken place recently in storehouse construction, equipment and operation.

Good facilities promote efficiency of operation, reduced stocks through centralization, proper protection of materials and supplies, and smallest possible investment through proper stock control. Good tools and appliances promote reduced labor cost, more prompt releasement of cars, more prompt shipments and increased efficiency of labor and reduced accident hazard.

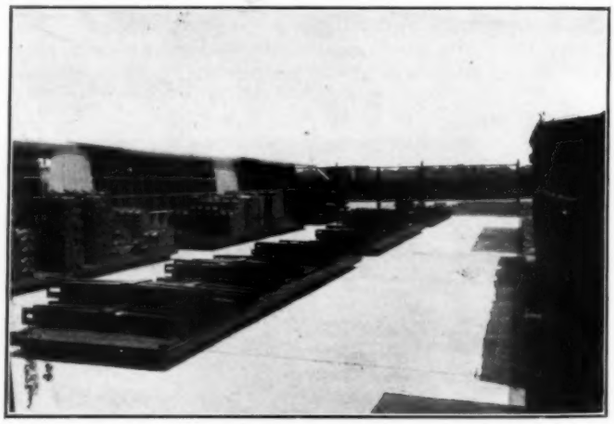
The committee's investigation has been to determine what has been accomplished with the structures and facilities as recommended by previous committees and to bring to your attention such new developments as have been completed during the past year. The advancement has been very rapid during this period. A number of railroads have completed construction of new store buildings and facilities into which they have embodied some very new and advanced ideas both in the storage and handling of material.

Buildings

The location of stores and stores facilities with respect to other buildings, switching yards, etc., is of vital importance to all departments of the railroad. No plan should be contemplated where new stores facilities are involved without representatives from all departments concerned being considered and all details thrashed out, giving full consideration to loading and unloading of cars, switching, delivery of material to users, the possibility of future expansion, the type of roadway and other equipment to be used in handling material.

The committee concurs with previous recommendations that the most desirable type of structure for storage of material is that of one floor only. It costs more money to put material either in a basement or transport it to the second or third floor, except where floor areas are excessive, or where the value of land in some locations necessitates the construction of buildings of more than one floor in order to obtain the desired floor space. Regardless of type of buildings, they should always be constructed on car floor level. The class of construction, we realize, depends to a great extent on the location. A building of class "A" construction, of concrete or steel, may be most desirable in the more rigid, cold climates or where severe weather conditions are encountered, while a less expensive type of fireproof construction may be as fully desirable in milder climates.

The main consideration is the economical handling of material. A one story building possesses advantages for easy and short trucking but where large floor area is required and a two or three story building is required, easy and quick access should be provided and where elevators are used they should be of four ton capacity and sufficient to handle an electric truck and trailer. One elevator should be provided for each 20,000 sq. ft. of floor



Island Platforms on the M-K-T at Bellmead-Waco, Texas

area. The self-leveling type of automatic elevator with push button control is desirable.

Ventilation should be given careful study. Good ventilation promotes efficiency of labor. Much of the material stored must be stored where it is dry and heat and ventilation should be arranged accordingly. Heating should be provided for both office and store in order that working conditions will be at their best and comfortable and that laborers can work in any part of it without wearing clothing that hampers their work.

Toilet facilities should be provided with adequate wash room facilities for office and store laborers. If women are employed, rest rooms should be provided.

Concrete platforms should be provided along entire length of storehouses and when motor trucks and trailers are used, a 14-ft. platform is recommended. All platforms should have ramps at the ends.

Lighting

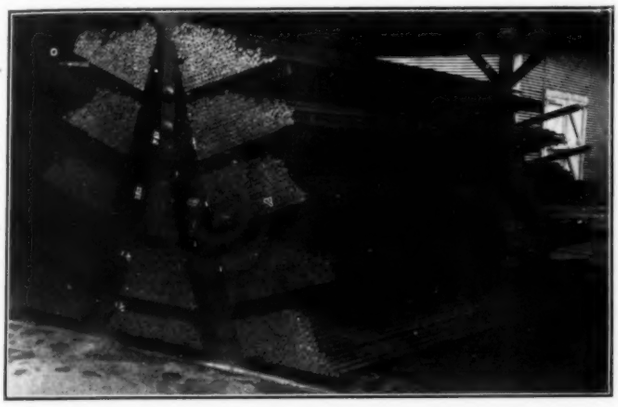
Day lighting is inexpensive and is essential for good storekeeping. For this reason factory type lighting is recommended: that is, full length steel sash between pilasters, three feet above the floor.

When providing artificial lighting the committee recommends individual rack lighting, each light controlled by double switch, and general aisle lighting with switches to throw on only the number of lights necessary to give the desired illumination for the work to be performed; with the heights of the rack lights equal to the height of the rack; the aisle lights for general lighting to be ceiling height.

Racks and Platforms

The committee recommends the open type rack, either wood or steel, with adjustable shelves, as this style rack is cheaper of construction and adapts itself better to the unit piling of material.

Rack arrangement should be such as to insure ample natural light and should be so placed that the handling of material will



An Adaptation of the Tree Type of Storing Bar Iron in Use on the Southern Pacific at Sacramento, Cal.

be reduced to a minimum with no dark pockets for the accumulation of rubbish, etc. Racks should be placed conversely in store houses, thus permitting natural light from side windows to illuminate the aisles and racks. When the racks are placed longitudinally they require more floor space and more artificial lighting.

The island platform is the most desirable method of piling bulk stock for both inside and outside storage.

Casting platforms at large shops should have an overhead traveling crane the entire length of casting platform. This crane should cover the track or tracks serving the platform to reduce handling costs of castings to a minimum.

The following methods of storing and racking for sheet, bar iron and steel, boiler tubes, pipes, etc., are furnished for information and guidance in view of the flexibility of design, providing for minimum space for maximum quantities, handling to or from storage by cranes, where necessary, along with the possibility of quick unit count.

Exhibit "A" illustrates the use of the "U" Bar Type and method of racking at general storehouses and large manufacturing shops, of stocks of bar iron or steel and pipe. This method permits

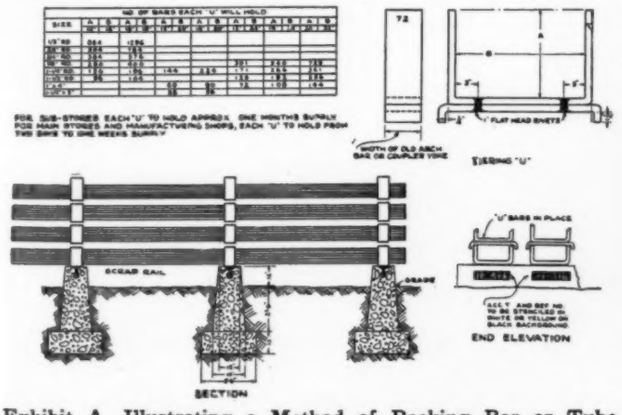


Exhibit A, Illustrating a Method of Racking Bar or Tube Materials by Means of U-Bars

the handling of bulk lots by cranes.

Exhibit "C" shows a less flexible type which may be used where minimum space is not a governing factor. The fixed uprights should be approximately of 6-feet spacing, while the intermediate uprights may be adjusted to meet the needs of specific size of stock of material to be cared for.

Oil Houses

For small stores oil house can be located at one end of store house with pumps, oil drums and waste, providing that portion of the building is separated from main store house by fire wall. Tanks of sufficient capacity should be provided in basement except fuel oil and gasoline which should be placed outside with the tanks underground. Provision should be made to remove any tank in the basement. This opening can be filled with material that can be removed easily. Self-measuring pumps are recommended for handling oils. These should be on first floor of oil house. No type of pump should be used that leaks around the piston or delivery spout. A barrage steam system of fire protection should be installed in all oil houses with the added protection of sand in barrels and pails principally for small fires, vapor proof lamps controlled by outside switch should be used.

Roadways

Paved roadways should connect store houses with public highways and all parts of the shop and terminal stores. These roadways not only serve in the distribution of material but also provide easy access for fire apparatus. Good roadways reduce the cost of maintenance on these vehicles to a minimum, keeping them in more constant service and speed up the delivery of material.

Fire proof storage vaults or safes should be provided in all stores buildings into which should be placed, at completion of each day's work, all important records such as stock books, pur-

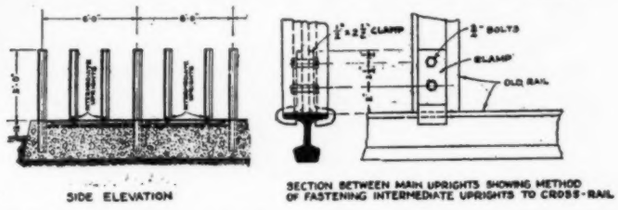


Exhibit C, Showing a Plan of Rack Made of Vertical Rail Sections with Intermediate Uprights which are Clamped to a Horizontal Rail Section so that These Intermediate Uprights can be Shifted According to Requirements

chase bills, etc., the loss of which, by fire, would be disastrous.

It is the consensus of opinion of this Committee that there is a great need for the assembling of plans of store buildings and facilities in compact form to be made available for use of all members of the Association.

It is recommended that such a permanent record be established in book form, in the offices of the Secretary of this Division.

As new facilities are constructed, the various railroads should be requested to forward floor plans and side elevations to the

Storage Racks on the Denver & Rio Grande Adapted to Overhead Crane Operations

secretary of the Division for consideration and acceptance, by the ensuing committee, for inclusion in the permanent record of such plans as indicate merit or embody new ideas.

We also feel that a book record of this kind would be very valuable to the members, covering outside facilities or devices

of any kind used in connection with the handling or storage of materials and supplies. The benefit we expect the Association to derive from this is making available an exchange of ideas.

Committee: E. H. Polk, district storekeeper, (S. P.), chairman; O. T. Burleigh, traveling storekeeper, (B., R. & P.); N. C. Gallaher, assistant general storekeeper, (M.-K.-T.); E. D. Hagerty, chief general material supervisor, (Penn.); T. J. Hegeman, staff of vice-president operation, (C. B. & Q.); W. S. Morehead, assistant general storekeeper, (I. C.); J. F. Rex, division storekeeper, (U. P.); R. J. Stackhouse, general storekeeper, (Reading); E. A. Workman, district storekeeper, (B. & O.), and A. W. Munster, purchasing agent, (B. & M.), chairman ex-officio.

Discussion

Immediately following the presentation of the report the motion was made and seconded that it be adopted.

J. W. Gerber (Sou.): The committee states that, regardless of the type, buildings should always be constructed on the level of the car floor. We do that in all buildings where we have shipping. But we build a ground level building in the case of a storehouse at a car repair yard where the material goes to the yard. While it may be quite a good sized yard and carry considerable stock it is seldom that any material is shipped away from that building.

The report also states that "For small stores, the oilhouse can be located at one end of the storehouse with pumps, oil drums and waste, providing that this portion of the building is separated from the main storehouse by a fire wall." We had that condition for a number of years on the Southern and always provided fire walls, but in the last few years we have put in the automatic fire-door. The advantage is, that if you operate your storehouse and oilhouse for 24 hours a day with three shifts, one man on the second and third shift, is often sufficient to care of both the storehouse and oilhouse.

Chairman Polk: This refers to light gravity oil. It is our recommendation that it be stored underground.

J. G. Stuart (C. B. & Q.): We have been building combination ground level and car floor storehouses at small points. We refer to some stores as receiving stores and some as issuing stores. The receiving stores are those which do not ship much material, and we have arranged that the oil cellar be placed at one end of the storehouse so that the tanks are practically outside of the storehouses. The top of the cellar forms the platform for storing material and for unloading cars. It is at car-floor height. We also have an incline which comes down from the platform to the floor level of the store which is slightly above the ground level. The pipes carrying the oil from the tanks to the pumps inside the storehouse enter the building on the ground floor level. It makes a satisfactory arrangement for unloading and handling material, and still saves the cost of building the storehouse at car floor height.

A. S. McKelligon (S. P.): I understand the A. R. E. A. has gathered considerable data in connection with standard buildings, including storehouses. I am wondering if we could not cooperate with them in some way.

The Chairman: Would you move to amend the motion, to have this committee join with the A. R. E. A. committee on the subject of stores facilities buildings?

Mr. McKelligon: Yes.

The Chairman: The committee accepts that as part of the motion. It is not necessary to act on the amendment then.

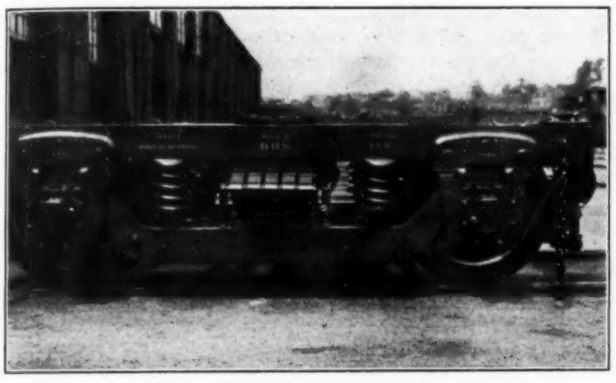
The motion to adopt the report was adopted following which stereoptican slides and motion pictures were shown as a part of the committee's work.

An Express Passenger Train on the Austrian Federal Railings.

New Devices

Roller Bearing Truck for Suburban Service

THE Hyatt Roller Bearing Company, Newark, N. J., is exhibiting a truck for suburban service which is a Commonwealth cast steel frame, four-wheel type. It is intended for service under a 108, 400 lb. steel coach. Instead of the conventional bronze bearings, Hyatt roller

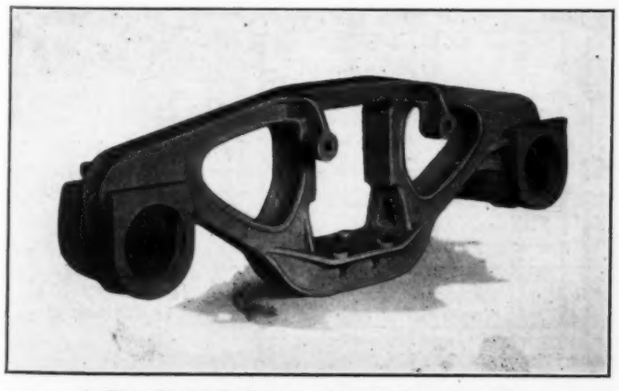


Truck for Suburban Service

bearings are applied to the 5-in. by 9-in. journals which are housed in electric steel journal boxes. The roller bearings are provided with an adjustable thrust arrangement. The boxes and bearings are applied without any change to the truck construction and meet all standard A. R. A. load requirements.

Gould U-Section Truck Side Frame

THE GOULD COUPLER COMPANY, 250 Park avenue, New York, is exhibiting a U-section truck side frame with integral journal boxes which was developed in the Symington side frame testing machine



The Gould U-Section Truck Side Frame

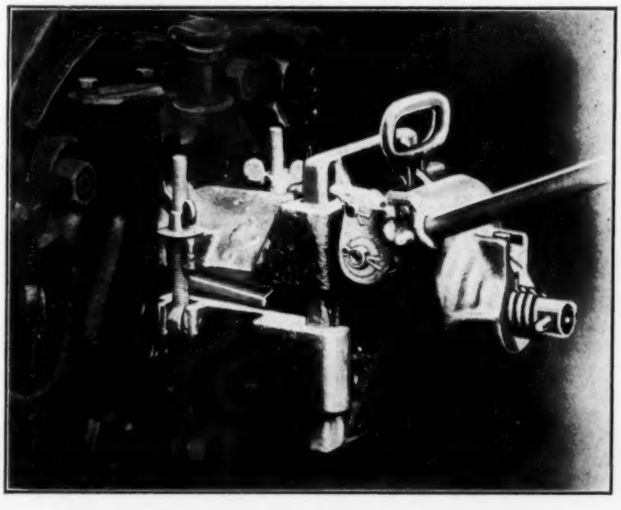
at Baltimore following experience with the A. R. A. and U. S. R. A. frames and a wide variety of miscellaneous designs. The frame is designed to show a high fatigue strength, which is said to be greater than that of any truck side frame so far tested. It weighs the same as the A. R. A. side frame with integral journal boxes.

The design at the journal box is unique in that the truss lines are carried exactly to the corner of the wedge bearing and all truss action or axial moments are said to be eliminated from the journal box walls. There are no points where flexing is concentrated, as all flanges are suitably tapered in height to ease off the flexing, which contributes to the increased fatigue strength and life.

To uniformly distribute uniformly the stresses set up by the squaring action of the spring plank, secured to the side frame by four lugs in the A. R. A. design, the spring plank seat is shaped to approximate a beam of uniform strength with reactions from the stiffer web element of the channel or U-section bottom member. Another characteristic is the intersection of the web of the channel shaped tension member with the bottom of the bolster opening and the outwardly and curved shape of the downstanding flanges beyond these intersection points. This element also closely follows the shape of the beam of uniform strength, gathering in material sufficiently beyond load applications to prevent distortion by providing moments of resistance which balance the moments of the couple set up by unsymetrical loading, or when one side of a spring nest goes solid in advance of the other.

Rapid and Safe Pinion Puller

IN order to provide a more positive and safe pinion puller than many home-made devices used for this purpose the Duff Manufacturing Company, Pittsburgh, Pa., has brought out a new pinion puller which is included as a part of its exhibit this year. This



A Two-Part Positive and Safe Pinion Puller

puller, on which complete patents are pending is constructed of but two parts: the thin-lipped jaws, which are clasped over the pinion, and the screw jack section which

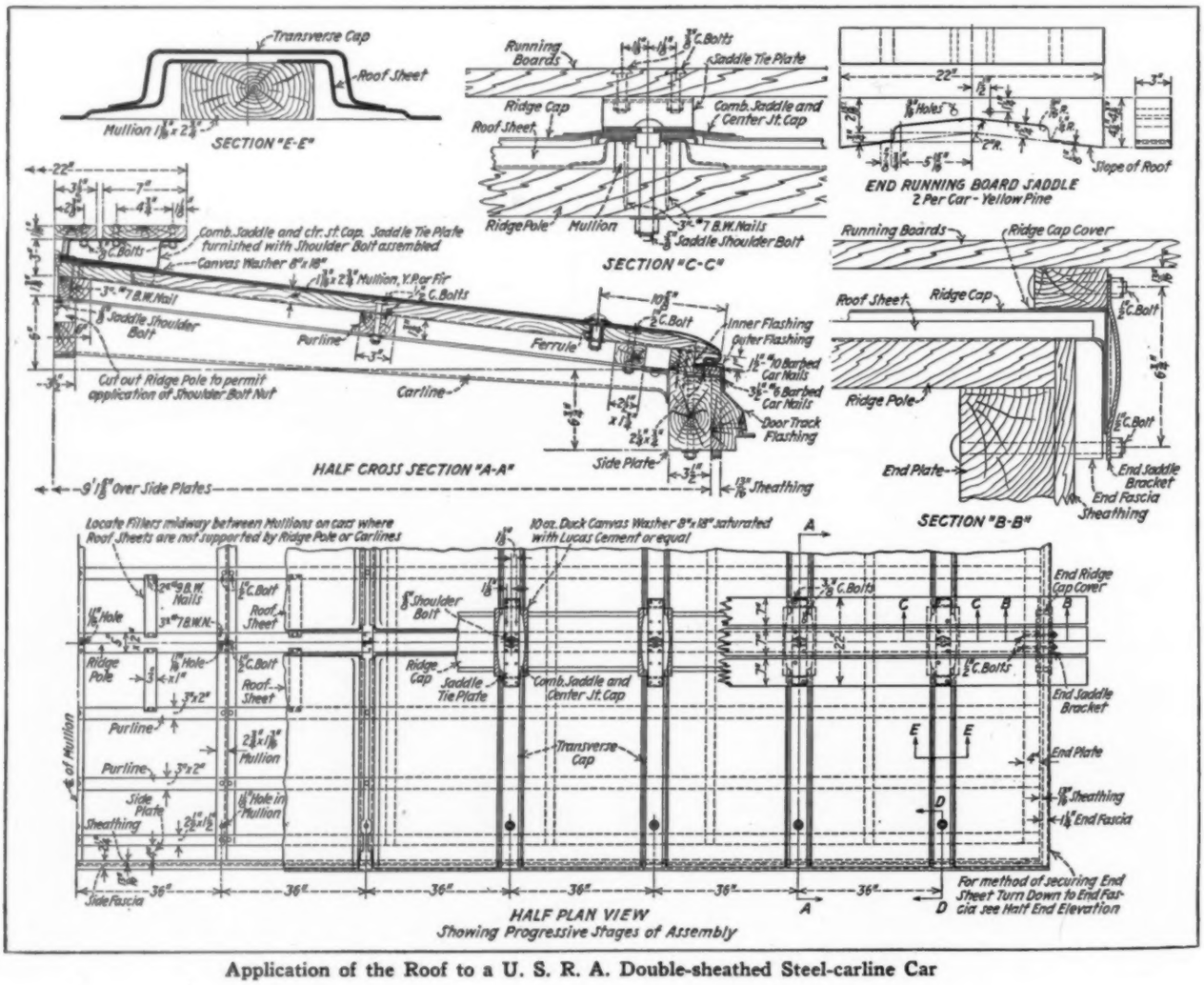
slides easily into the jaw grooves. When attached, the operator turns up the screw by hand until it makes contact with the end of the shaft. A few strokes of the jack lever will bring all parts into extreme tension—a few more strokes and the pinion is removed. An important safety consideration lies in the fact that the operator stands to the side and clear of the pinion. The pull of the Duff pinion puller is uniform around the entire periphery of the pinion and the worm and screw action exerts a tremendous force. No tapping of the end of the screw is necessary.

This tool weighs 50 lb. The housing and jaws are of case hardened steel and ball bearings are used throughout. Three sizes of jaws are available to meet the requirements of various pinion sizes. While primarily built for pulling pinions it can be quickly and economically adapted to the removal of pulleys, pumps, small fly-wheels and other appurtenances from almost any kind of shaft.

A Universal Freight Car Roof Construction

IN ANNOUNCING the new Standard Dry Lading All-Steel Roof the Hutchins Car Roofing Company, Detroit, Mich., makes available a universal roof for house cars which, it is claimed, may be applied to any standard-gage box car, regardless of length, width or type of construction. Essentially the new roof, which is a modification of the Dry Lading Roof that has been in service for 15 years, consists of a certain number of standard size parts, a combination of which may be arranged to fit cars of varying lengths or widths irrespective of wood or steel superstructure, whether single-sheathed or double-sheathed wood or steel or all-steel, and irrespective of whether the car has wood or steel carlines of any design, or wood or steel side plates of any description. The following parts, standards as to size and shape, make up the roof: Intermediate sheets and sheets, transverse caps, combination joint caps and running board saddles, ridge caps and inner and outer flashings. All of these parts are made from 1/16-in. galvanized steel with the exception of the combination joint cap and running board saddle, which is of ⅛-in. pressed steel.

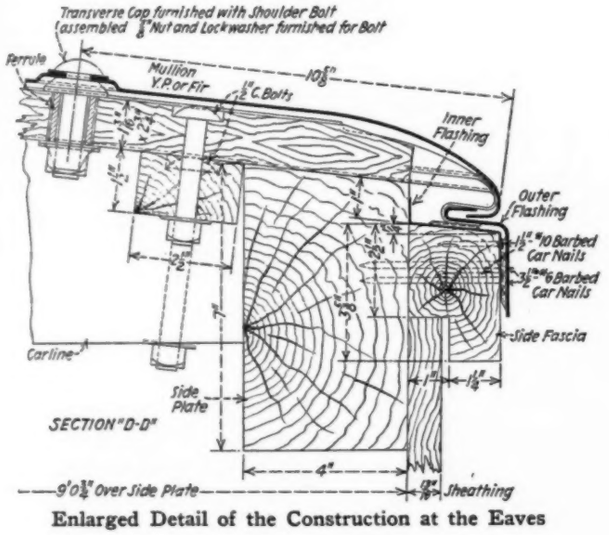
In the design of this roof it was necessary to study the sizes and constructional details of many thousands of box cars and it was found that the variation in width between the narrowest and the widest is 14 in. Therefore this roof is designed for application to car widths within that limit of variation and for car lengths from 30 to 50 ft. The one feature of this roof which, more than any other, seems to make possible the claims of the manufacturer for universal applicability is the use of wide ridge caps which fit over the upturned inside ends of the transverse sheets, so that it is possible, by varying the position of opposite transverse sheets from contact at



Application of the Roof to a U. S. R. A. Double-sheathed Steel-carline Car

the center line of the car to a separation of about 14 in., to adapt the roof to cars of the width variation mentioned: The provision for variation in car length is made by the use of the combination of a number of standard length intermediate sheets and either trimmed end sheets or, if desired, a special telescoping end sheet.

The two drawings show the details of construction and application of the roof to double-sheated cars, having wood side plates and mullions, one with steel carlines and one with wood carlines. It will be noticed that the intermediate sheets are of pan-like formation on three sides and formed to mesh with the outer flashing at the eaves. At the center the intermediate sheets are covered by the



Enlarged Detail of the Construction at the Eaves

ridge caps and at the joints by the transverse caps. At the junction of the ridge caps and intermediate sheets the joint is insulated with a canvas washer and covered by the combination joint cap and running board saddle, the length of which has been standardized for a 20-in. running board.

The smaller of the two drawings, which is a cross section, shows an enlarged detail of the construction near the eaves. In the case of the wood construction shown, the transverse cap and intermediate sheets are held in place by a standard shoulder bolt riveted over at the outside end and held by a nut and lock washer on the inside, a ferrule being used through the mullion. In the case of new cars or cars built with steel carlines, the ferrule is not necessary and the same bolt is used, but may be cut off or allowed to protrude beyond the nut as desired. A bolt of slightly different design is used to hold the ridge joint caps in place.

Again referring to the smaller drawing, there is an interesting feature in connection with the formation and application of the several units at the eaves. It will be noticed that the intermediate sheets are formed to fit into the roll of the outer flashing from the inside. By this construction any temporary deformation of the car shape, due to rough handling or switching movements, place no strain on the roof sheets. This should minimize the tendency to fracture the protective coating of the sheets with a consequent exposure of unprotected metal to the elements.

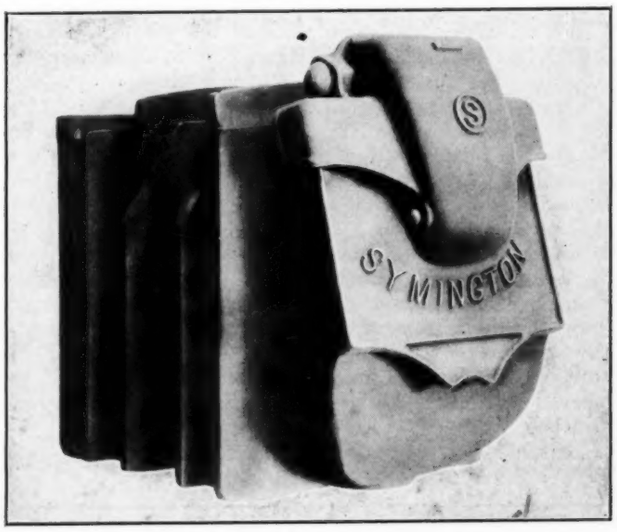
In general the only shop operation required would be the trimming of end sheets and end ridge cap units to accommodate the remaining car length not provided for by the several standard length intermediate sheets, but if desired a telescoping end sheet and end cap may be furnished which obviates the cutting and trimming.

Aside from the small details like bolts, washers, etc., it would seem necessary for an individual road to carry only a quantity of the seven or eight standard size units of this roof to provide for the application of a new roof to any house car which that road might find it necessary to make.

At the Hutchins exhibit in space 616 will be found several models of this new roof on which the simplicity of construction and application may readily be observed.

Symington Articulated Journal Box Lid

THE SYMINGTON COMPANY, 250 Park avenue, New York, has on exhibit an articulated, fully equalizing machined or ground joint journal box lid which employs a new principle in journal box design. The joint surface, which is machine or ground, fully closes the box opening. With separable journal boxes having the front opening or lid face machined with



Symington Journal Box Lid with a Hood to Protect the Joint

exact reference to the forward or pin bearing surface of the hole in the hinge lug, the contact is equivalent to a machined joint.

The lid housing includes the usual loops and hood over the hinge lug, providing a means of attachment to the lid proper at its central point. This hood is expanded to form an "umbrella" extending over the top of the front of the box and partly down the sides. This hood protects the machined or ground joint from accumulations of snow, ice and dirt or the direct action of a driving rain.

The spring pressure is transmitted to the lid at its central point so that the closing pressure is equal on all sides. Flexibility is provided between the lid proper and the connecting parts in order that the lid will fit tightly and compensate for angular misalinement between the hinge pin and the face of the box. With the exception of the spring, all parts of the lid are made of malleable iron. The spring is helical, with squared ends, and acts between the lid lever and the housing.

Motor Transport Exhibit

Safety Treads for Motor Buses

THE Morton Manufacturing Company, Chicago, is exhibiting its Kass safety treads designed for use on motor buses. The treads are made of copper bearing sheet steel in various gauges, depending upon whether or not they are to be installed as plates merely to rest upon another base, or to be self supporting. Small bosses or buttons are pressed into the plates, the center of each boss being perforated by a ⅛-in. hole. The treads are made in any shape, with or without flanges or curved to suit any condition.

Numerous Improvements In New White Bus

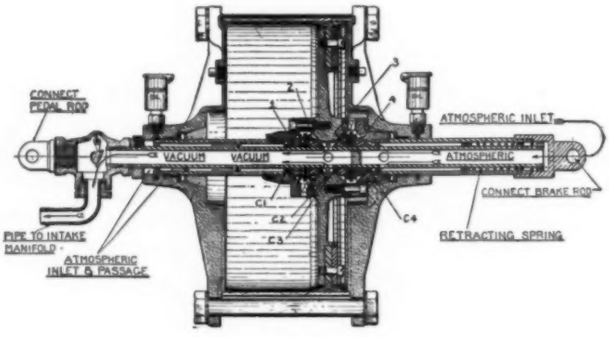
THE model 50-B motor bus of the White Company, Cleveland, with a capacity of 25 to 29 passengers, has numerous new refinements making for flexibility and smooth operation which render it different from the Model 50-A, which it replaces in the company's line of buses. The model exhibited is one of eight White buses recently delivered to the Boston & Maine, these eight bringing that company's fleet of White buses up to 23.

Among the new features of the 50-B model are Westinghouse air brakes operating on the rear axle, a new steering gear, a heavy cast aluminum shell radiator, an improved oiling system with a large pump capacity and a new method of screening the oil. The steering gear and double reduction gear axle with double bearings of the tapered roller type are also new. The speed ratios have also been changed.

This model is equipped with a 29-passenger pay-enter type of body for city service and a 25-passenger parlor car type of body with a baggage compartment for intercity service. The model shown is the pay-enter type. In addition to the Boston & Maine, several other railways operate these buses, including the Spokane, Portland & Seattle, the Great Northern, and the New York, New Haven & Hartford.

Vacuum Booster Brake

A VACUUM booster cylinder for hydraulic or mechanical brakes of buses and trucks, which supplies additional power for braking with little effort on the part of the driver, is exhibited by the Bragg-Kliesrath Corporation, Long Island City, N. Y. The



The Vacuum Booster Brake

vacuum booster brake is a double-acting power cylinder, the piston of which follows the movements of the driver's hand or foot, supplying the power required for any de-

A Model 50-B White City Type Bus

sired brake application and relieving the driver of practically all physical effort in stopping his vehicle.

The power cylinder which is attached to the frame is operated by air at atmospheric pressure, acting against the vacuum or suction created in the intake manifold of the motor. The brakes are connected to the piston while the manually operated pedal or lever is connected to the valve mechanism within the hub of the piston. The only work required for an application of the brake is the overcoming of the light tension of the springs within the valve mechanism and the retracting springs for the foot pedal lever, as the piston, acting under the differentials of pressure created within the cylinder, moves in the same direction and to the same extent that the foot pedal has been moved, applying or releasing the brakes.

Yellow Type Y Parlor Coaches

THE Yellow Truck & Coach Manufacturing Co., Chicago, is exhibiting several types of parlor coaches on its Type Y chassis. This chassis is powered by the six-cylinder Knight sleeve valve engine and is fitted with bodies having seats for 25 to 29 passengers. The seats in the parlor coaches are of the familiar individual chair type, made of wicker and fitted with detachable double cushions, the cushion backs and arm rests being covered by brown leather. The interior finish is in fabric leather to match the seats, the side post panels and roof headlining being of mahogany. Each side post is fitted with a mirror and the floor is covered with heavy linoleum.

The buses are heated from the engine exhaust and are ventilated by four ventilators of large capacity. Additional ventilators are provided in the sides and top of the cowl. The interior is illuminated by 10 glass dome lights. Window drapes at the side and rear windows slide on nickel rods.

The entrance door at the right front is controlled by an adjustable mechanism from the driver's seat. A safety door is located at the left rear side of the coach and a baggage door at the right rear side. In addition to the baggage compartment inside the bus at the rear, a luggage rack is located on the roof and is made accessible by a ladder at the rear of the coach. A particularly interesting feature of these buses is the ventilating eaves over each window.

The wheels are of the pressed steel disc type, the tires being pneumatic all-around with single tires on the front wheels and dual tires on the rear wheels. Four-wheel pneumatic brakes are standard equipment.

Type Y parlor coaches are in the service of a number of railways, including the New Haven, the Great Northern, the Chicago, Milwaukee & St. Paul, the Colorado & Southern and others.

Brown Body Shown in White Exhibit

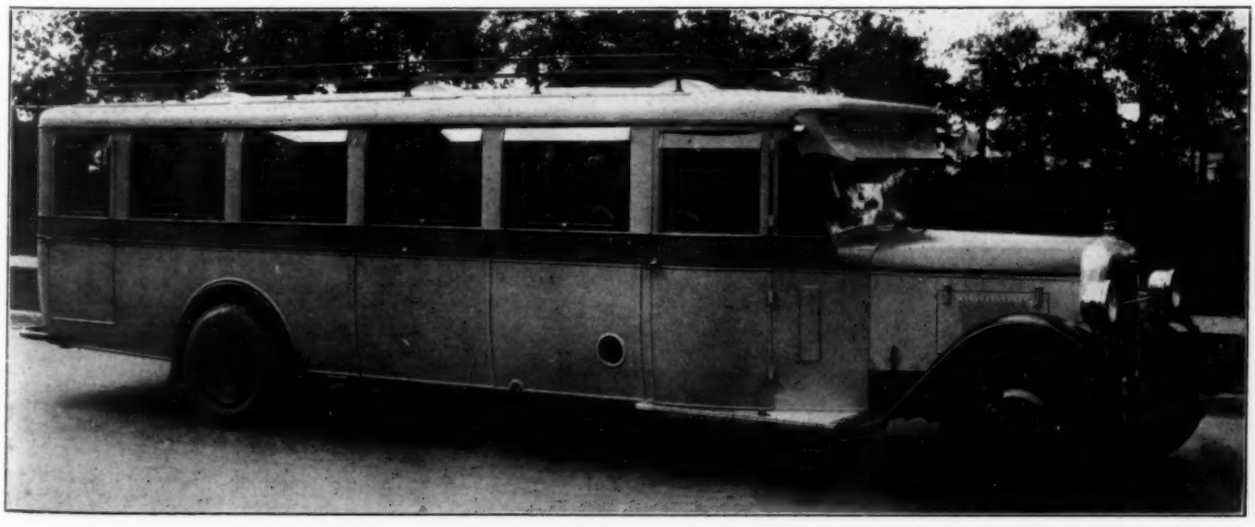
A PARLOR type body mounted on a White Company chassis is being exhibited by the Brown Body Corporation, Cleveland, Ohio. The individual seats are upholstered in genuine leather, the double seat cushions and backs being removable. Imitation leather is used in covering the head-lining and paneling to match the seats. The floor is covered with inlaid rubber matting, laid over a hair felt base.

The wide plate glass windows are set off by curtains of a material which matches the other upholstery. Eight dome lights and adjustable ventilators set into the roof provide for light during night driving and for ventilation.

Brown Body Mounted on White Chassis Operated by the New Haven

The doors are of the coach type, the service door being on the right-hand side at the front, with emergency and baggage doors at each side in the rear.

With the baggage compartment installed inside the bus at the rear, the usual parlor type chairs are replaced by folding seats which may be pressed into service when no baggage is to be carried.



Yellow Type Y Parlor Coach

Generator Designed for Bus Service

A GENERATOR especially designed for bus service is included in the exhibit of the Robert Bosch Magneto Company, Inc., New York. The generator is grounded, showing negative polarity on its frame unless otherwise specified. Positive frame polarity is provided, if desired, however.

In the exhibit the generator is a part of a bus lighting equipment demonstration designed to reproduce the lighting conditions met in bus operations and to show how the generator operates to keep the battery charged under the extremes of day and night running. The demonstration also shows the ability of this generator to operate lights directly without the use of a battery.

Studebaker Exhibits Parlor Bus

THE STUDEBAKER CORPORATION, South Bend, Ind., is exhibiting a 20-passenger parlor bus equipped with individual arm chairs, the backs of which are upholstered in silver gray mohair. The cushions

Interior of Studebaker Parlor Bus

and seat backs are covered with Spanish leather. The windows are wide and equipped with curtains. Light and ventilation are provided by six ventilators and six dome lights.

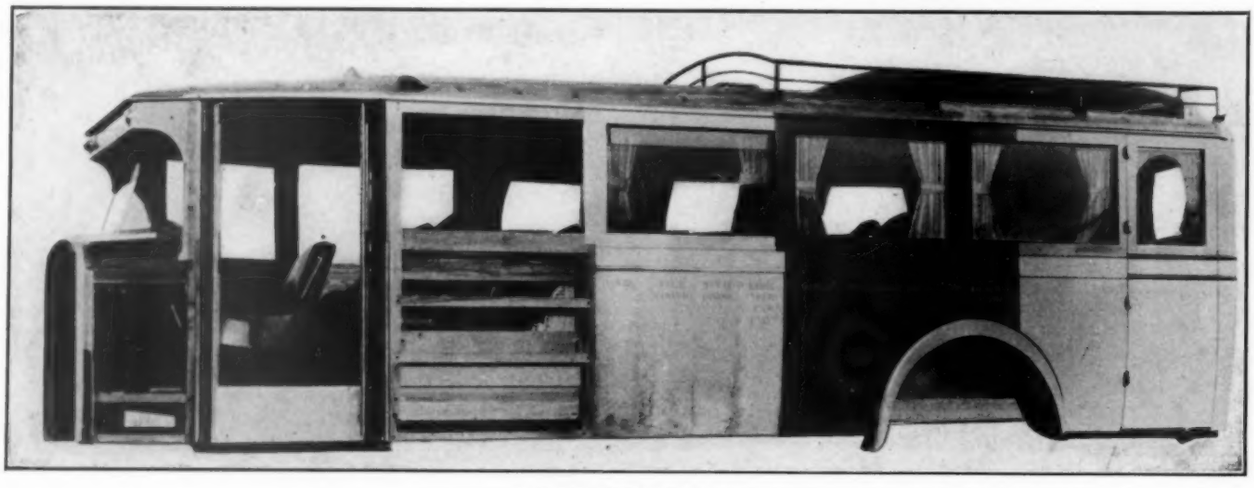
The rear eight seats of this bus, as shown in the illustration, are arranged facing each other so as to be particularly convenient and attractive for groups of passengers. The seating arrangement is made even more unique by the placing of the other seats. Back of the driver's seat is a row of three chairs, the aisle running along the right side. Back of these are two rows of four seats divided by the aisle which runs down the center.

On the standard parlor type bus a door is located at the front on the right-hand side with an extra door for a driver and one at the rear for emergency. A special 18-passenger model, however, has side entrances giving access to each row of seats. A railed-in space for storing baggage is provided back of the fourth tier of seats and there is also room under each seat for small parcels. A railed baggage compartment on the roof is optional. The bus is powered by the six-cylinder Studebaker engine and is equipped with four-wheel hydraulic brakes.

Lang Bus Body Shown in Stages of Construction

THE Lang Body Company, Cleveland, Ohio, is exhibiting a bus body which shows the various stages of its construction, including the application of metal, paint, interior finish, roof construction, etc. Three types of roof construction are shown, the monitor, hump and regular. Other parts of the exhibit show the various window regulating devices, heating devices, door operating fittings of both coach and folding type, interior appointments showing various types of chairs used and their arrangement, different kinds of trimming material, a section showing the observation parlor car type which originated on railroad equipment, toilet facilities, summer and winter construction with storm windows for severe climates and screens for warm climates, various designs of wind shields, ventilators, etc. The exhibit is designed to show all possible methods of bus body construction, with a view to determining what features are particularly desired by the railways.

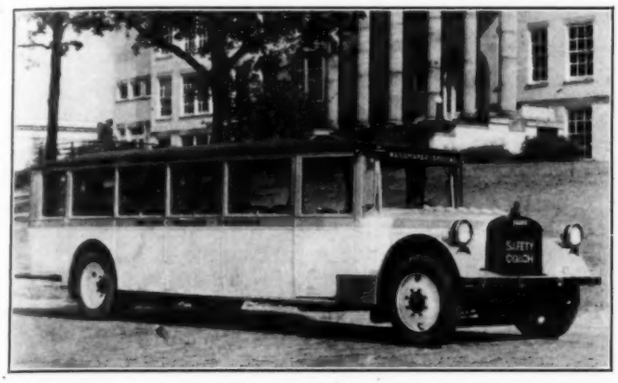
The New Haven has recently placed in service a number of buses having special parlor coach bodies designed by the Lang Body Company. These were described in the *Railway Age* of March 27.



Lang Exhibit Body

Urban Parlor Car Featured by Fageol

AN URBAN parlor type motor bus which adapts the parlor car model to the requirements of city and suburban service is being exhibited by the Fageol Company, a division of the American Car & Foundry



The Fageol Safety Coach

Motors Co., New York. The urban parlor bus retains to a large extent the lines of the inter-city type parlor bus but allows full headroom for standing passengers.

The seats for 29 passengers are of the individual type and of wicker and metal construction, the overstuffed cushions being upholstered in brown Spanish leather. The interior finish is of waterproof fabric and all woodwork is in hand-rubbed mahogany.

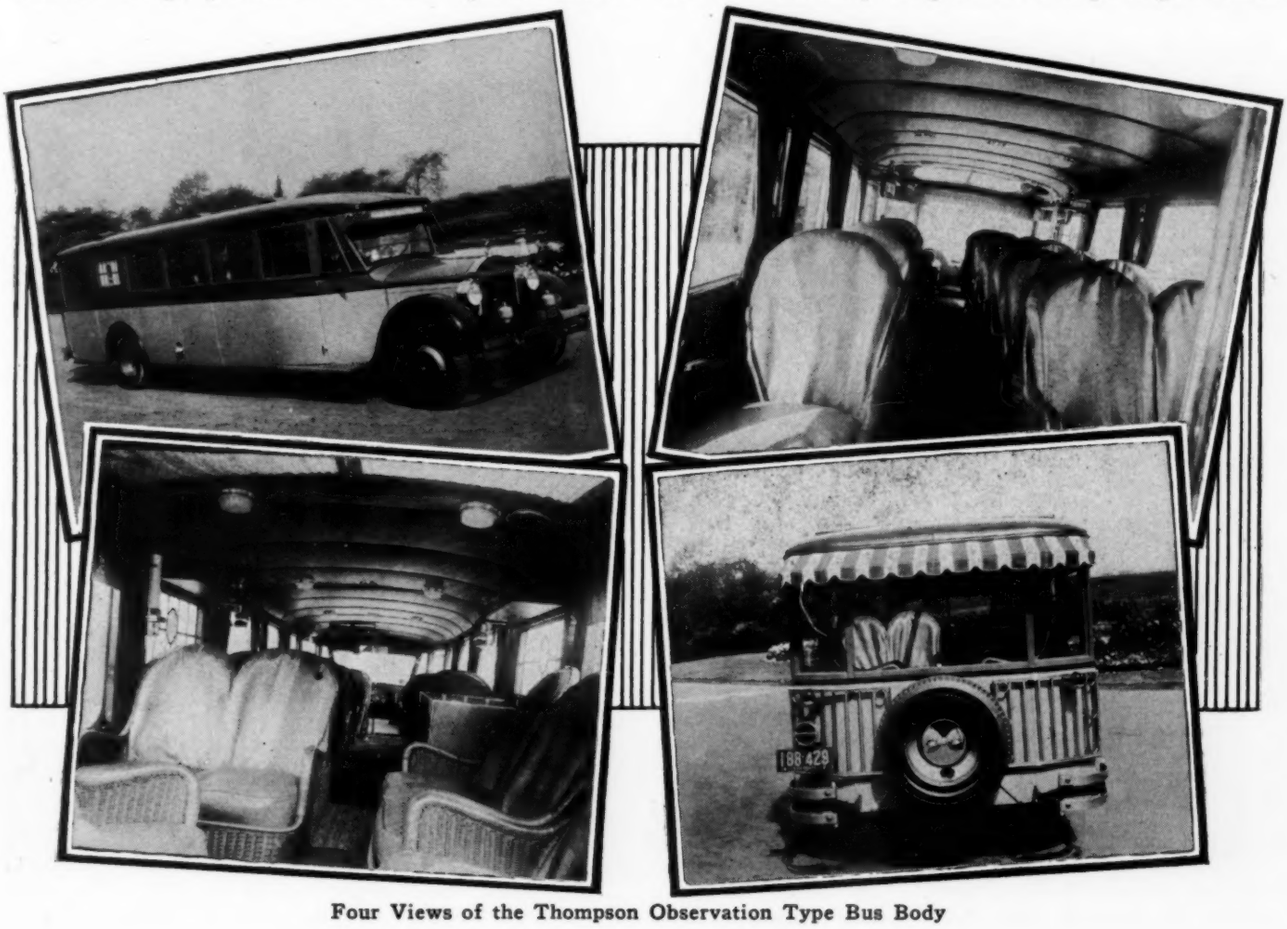
This bus is equipped with the six-cylinder Hall-Scott engine to which a governor is attached, limiting the speed of the bus to from 36 to 45 miles an hour, depending on the gear ratio.

The Fageol Company is also exhibiting a standard parlor type coach adapted to inter-city transportation. This coach, which has seats for 26 passengers, is equipped with individual wicker chairs upholstered in grain leather, the interior body lining being velour and the floor covering, heavy velvet carpet. The windows are fitted with curtains mounted on nickel plated rods. Space for baggage is provided in the rear of the body, there being an extra space for an overflow of baggage on a railed-in section of the roof.

Thompson Company Exhibits Observation Bus Body

AN OBSERVATION club car body made to its original design and mounted on a Mack chassis is being exhibited by the E. J. Thompson Company, Pittsburgh, Pa. Another Thompson observation type body is included in the exhibit of the Yellow Truck & Coach Manufacturing Co.

The feature of the observation parlor type body is the arrangement of seats at the rear and the completely glassed-in rear end. This gives a practically unobstructed view of the country being traversed to passengers seated



Four Views of the Thompson Observation Type Bus Body

in the observation end. Protection from direct sunlight is afforded by the striped awning at the rear.

The chairs are arranged in a staggered fashion and are of the familiar leather upholstered, individual type. They are also equipped with arms. The wide glass windows along the sides of the body are set off by drapes.

The body is of full aluminum construction with copper screens and a sloping front and a quadrant ventilating window on each side. The body exhibited is painted in enamel with vermilion superstructure, moss green belt, black molding and light gray lower body.

Demonstrate Worm Drive Principle in Bus and Truck Axles

THE Timken-Detroit Axle Company, Detroit, Mich., is demonstrating in its exhibit how the worm drive principle is applied to motor bus and motor truck axles. The exhibit shows all moving parts of the axles in action, the housing, reinforcing sleeves, etc., having been cut away. The drive shaft is turned by an electric motor. Anti-friction bearings, gear contacts and all other parts are exposed. The axles exhibited include a dual axle embodying the six-wheel principle, a single drive motor truck axle with worm overslung, a single drive motor coach axle with worm underslung and a double drive two-carrier axle with no mechanical differential, intended for use with two-motor gas-electric coaches.

International Harvester Exhibits Parlor Motor Coach

A 29-PASSENGER parlor type motor coach exhibited by the International Harvester Company, Chicago, is equipped with a large six-cylinder engine and with auxiliary springs in addition to main springs, which go into action after the load reaches a certain weight, eliminating rebound and providing for comfortable riding for any load, either light or heavy. The individual chairs are staggered and of fibre construction with leather cushions. The interior is roomy

International Harvester Parlor Coach

and finished in imitation leather to match the genuine leather of the seat cushions. The windows are wide plate-glass, and are fitted with mohair side drapes.

Westinghouse four-wheel air brakes are standard equipment on coaches of this type. Standard railroad straight air balanced spring type control, with pressure regulated through safety valves, is used. The front wheels are single and the rear dual, and are fitted with pneumatic tires. The housing of the motor and the housing of the transmission are separately mounted on a heavy pressed steel "banjo" which absorbs frame stresses and permits the removal of either the motor or the transmission without disturbing the other.

The Great Northern through the Northland Transportation Company, the New York, New Haven & Hartford through the New England Transportation Company, and the Chicago, Burlington & Quincy own and operate coaches of this type.

Inside Baggage Loft Feature of Raulang Bus Body

THE Baker-Raulang Company, Cleveland, Ohio, which has recently begun the manufacture of bus bodies, is exhibiting a parlor type body which has as one of its noteworthy features an inside luggage loft on which several patents are pending. This loft consists of a formed sheet metal shelf strongly supported from

Interior of Raulang Bus Body Showing Baggage Loft

the body sides by pressed steel brackets which carry the underside of the loft well above the heads of seated passengers. It extends along both sides of the body and across the rear above the window openings and has ample space for storing hand luggage and parcels. Near the entrance door and at the rear the compartments are made longer to accommodate golf clubs, fishing tackle and other unwieldy bundles.

The Baker-Raulang body has a low exterior appearance but there is ample headroom over the aisles for persons standing or walking. The seating capacity is increased by approximately five passengers by the use of the baggage shelf since no floor space is taken up by baggage.

The interior finish of the body is luxurious. The individual wicker chairs are upholstered in Mohair, and the

dome lights in the ceiling are augmented by smaller individual lights set in the window posts. In addition to the main entrance door at the front, there are emergency doors on each side at the rear.

Air Springs Add to Bus Passengers' Comfort

AIR springs which float the chasses of buses and trucks on cushions of compressed air are frequently specified by railway operators of buses and trucks. The Cleveland Pneumatic Tool Company, Cleveland, Ohio, is exhibiting its Gruss air springs which are being used by the Boston & Maine Transportation Company for the Boston & Maine, by the New England Transportation Company for the New York, New Haven & Hartford, by Fred Harvey for the Atchison, Topeka & Santa Fe, by the Northland Transportation Company for the Great Northern and by the Canadian Pacific.

Air cushions absorb road shocks and the resultant vibration, prevent the throw of the front wheels and help the steel springs to recover instantly in order to be ready to function immediately for successive shocks. The Transport size air spring has a bore of 3½ in. and a stroke of 6 in. The steel springs of the bus or truck are attached to the air spring in the same manner as they are attached to the original spring hanger. The cushioning effect is provided by the compressed air chamber at the top of the air spring. When the vehicle strikes a bump or depression, the resilient air cushions absorb most of the shock.

Six-Wheel Coach Has Unusual Roof Structure

THE Model 64 Six-Wheel motor bus exhibited by the Six-Wheel Company, Philadelphia, Pa., and designed either for city or inter-city service, has a distinctive new feature in the arcade type of roof which gives the appearance of lowness from the outside while allowing 75½ in. of headroom over the aisle inside. From the peak extending along the length of the aisle of the bus, the roof dips down sharply on each side, leaving the maximum headroom over the aisle where it is needed, and less headroom over the seats.

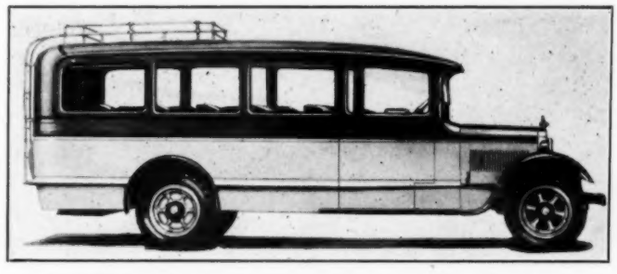
The front entrance door is of the street car, double jack-knife, folding type. In addition to this there are doors at the rear on each side. The right hand rear door opening into the baggage compartment opens only from the outside. The left hand rear door, to be used in emergency, opens from both outside and inside. Five seats of the folding taxi type are installed in the baggage compartment at the rear of the bus for use when the compartment is not needed for baggage. Balloon tires on all six wheels are standard equipment.

The bus is powered by a six-cylinder engine, the brake equipment being of the Westinghouse type. The brakes operate on the four rear wheels.

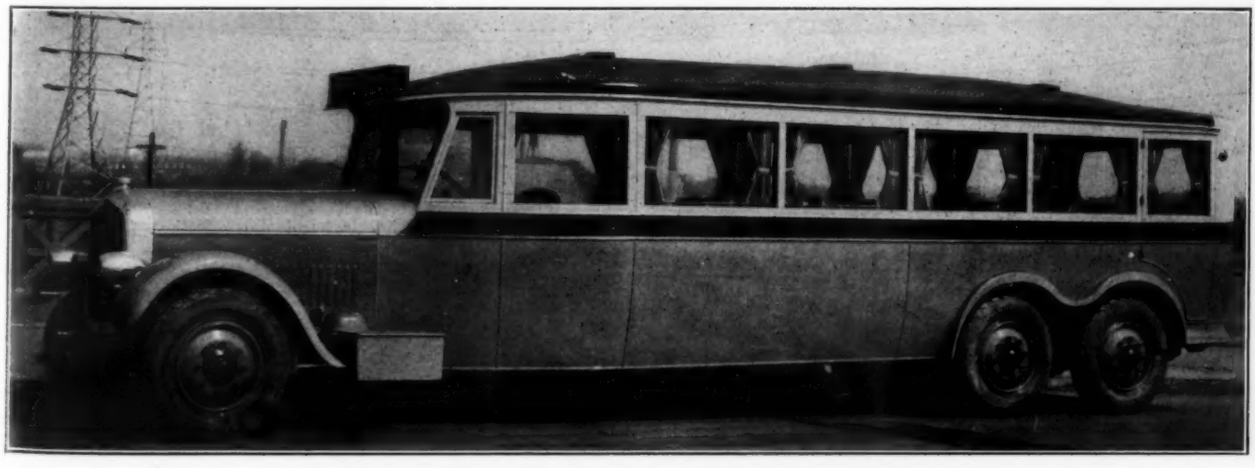
The interior of the Six-Wheel bus exhibited is equipped and finished in the manner typical of parlor coaches. The individual chairs are upholstered in leather and the wide plate glass windows are set off by drapes. Three ventilators in the roof provide for ventilation.

Graham Brothers Show Small Bus

SMALL size, with resultant operating economy yet with comfort for passengers, is emphasized in the motor buses exhibited by Graham Brothers, Detroit, Mich. The parlor bus seating 12 passengers is particularly suited to inter-city transportation service. It is equipped with the four-cylinder Dodge Brothers engine.



Graham Brothers Small Size Parlor Bus



The Six-Wheel Parlor Coach with Arcade Type Roof

The four wheels have steel spokes and are fitted with heavy balloon type pneumatic tires. The brake drums on the rear wheels are exceptionally large.

The interior is notable for the parlor type individual chairs which have deep cushions and are upholstered in leather. The plate glass windows are wide. Entrance to the bus is made by a wide door on the right-hand side at the front. The baggage rack located on the top of the bus is reached by a ladder at the rear end.

A pay-enter street car type coach seating 21 passengers is also exhibited, this being especially adapted to city service.

General Motors Develops Tractor-Truck

THE General Motors Truck Company, Pontiac, Mich., a division of the Yellow Truck & Coach Manufacturing Co., is showing for the first time the "Big Brute" tractor-truck which has been especially designed and built for volume tonnage hauling. The tractor is shown with a special trailer body particularly adapted to railway hauling which has been developed by the Motor Haulage Company of New York.

The New General Motors Tractor Truck

Two features of these tractor-trucks are the 17-ft. turning radius and a special construction which permits the use of any fifth wheel manufactured. The front and rear springs are designed for flexibility, to make the tractor-truck easy riding both when it is empty and when it is hauling a load of trailers, and the comfort of the driver is further cared for by the semi-enclosed cab built by the Fisher Body Company.

The two-range transmission permits the application of more power in climbing hills and getting over rough roads without uneconomical over-powering, but without sacrificing speed where the road is good.

Extremely heavy loads and overloads on motor trucks are prohibited generally by the limited capacity of trucks and by state laws. Such loads can be hauled by tractor-truck and trailer, it is said, without violating state laws restricting maximum weight. The tractor-trucks built by General Motors have capacities of 4, 6, 10 and 15 tons.

Small Parlor Bus Shown by Garford

A SMALL parlor type bus designed to meet the requirements of operation in service where large capacity is not needed is being exhibited by the Garford Motor Truck Company of Lima, Ohio. The chassis has a six-cylinder engine, four-wheel hydraulic brakes, and single front and dual rear tires.

The body, which is built by the Garford Company, is equipped with six crosswise seats with room for two passengers in each and one seat across the rear for five passengers. The cushions and seat backs are covered with genuine leather. Illumination at night is furnished by four dome lights and ventilation is provided by two ventilators in the roof. All fumes from the engine are carried away by a patented ventilator in the cowl. The main entrance to the bus is at the right front side, an emergency exit being located at the left rear.

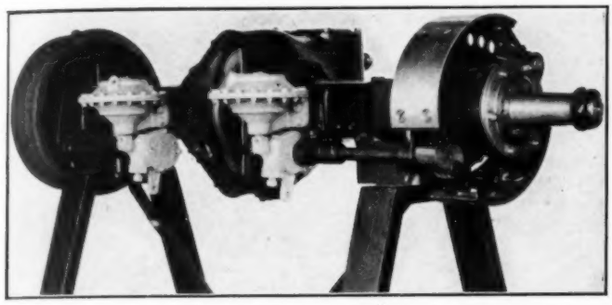
Because of the smaller size of this bus, both the front and rear wheels are single ones, with heavy pneumatic tires. A baggage-carrying rack is located on the roof and is equipped with a heavy fabric cover.

Garford Parlor Type Buses

Automotive Air-Brake Equipment

THE Westinghouse Air Brake Company, Wilmerding, Pa., is exhibiting several demonstration racks illustrating the application of air-brake apparatus to different forms of automotive equipment. One rack includes a brake valve, a reservoir and brake chambers with slack adjusters mounted on a Timken rear axle. This rack obtains its air from an automotive compressor of 6 cu. ft. displacement.

Another rack consists of a Timken front axle for bus, truck or trailer, showing one of the forms of adapting



Westinghouse Automotive Air Brake Equipment

air brakes with metal shoes to front wheel application. The internal expanding metal shoe equipment for front axles is of the same construction as that now used for rear axles. Each of the two brake shoes swings on its own hinge pin, affording independent shoe action so that variation in rate of wear and other factors on one shoe do not affect the other.

A third rack displays one of the White Company's rear axle mountings equipped with air brake apparatus. The mounting of the air brake cylinders and slack adjusters and the appliction of metal shoe equipment are shown.

Reo Features Small Parlor Bus

A PARLOR type bus of medium capacity is a feature of the exhibit of the Reo Motor Car Company, Lansing, Mich. Ample power is furnished by the six-cylinder Reo motor with a balanced crank shaft. Four-wheel brakes are standard equipment. Both

Reo Parlor Type Bus

front and rear wheels are of the single type because of the light weight and small capacity of the bus, the steel disc wheels being fitted with oversize balloon tires.

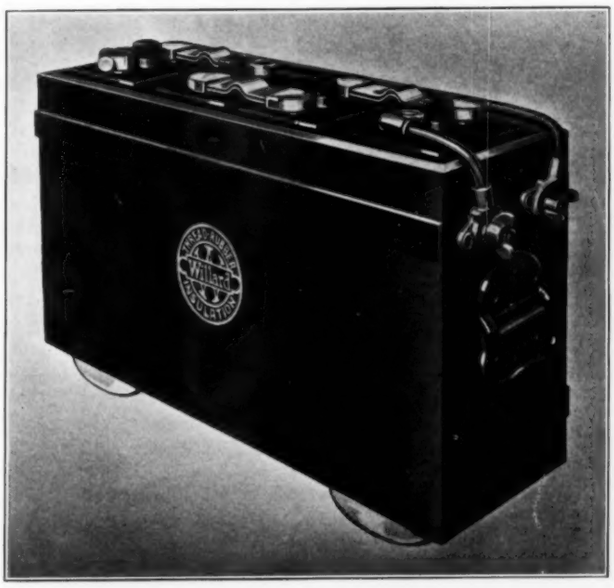
The interior of the body is equipped with individual chairs upholstered in leather. The chairs in the rear end are arranged to face each other, providing a particularly convenient place for groups of passengers. The wide plate glass windows are set off by drapes.

Ventilation is furnished by two ventilators set into the roof, and dome lights furnish illumination for night traveling. The baggage accommodations consist of a railed-in section on the roof at the rear which is made accessible by a ladder at the rear end. The main entrance to the bus is located at the right front side of the bus, in addition to which there is an emergency exit at the left rear side.

Bus and Train Lighting Batteries

IN ORDER to meet the demand for a storage battery which is particularly adapted to the requirements of bus and rail motor car service, the Willard Storage Battery Company, Cleveland, Ohio, has developed three types of bus batteries and a special light-weight train lighting battery especially adapted to rail car service.

The train lighting battery shown in the illustration is constructed with hard rubber jars and covers, semi-flexible top connectors with perforated rubber separators, and



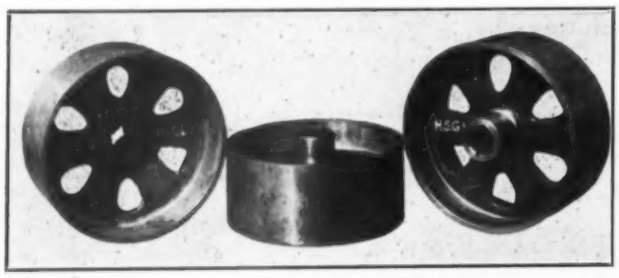
Willard Light-Weight Rail Motor Car Lighting Battery

wing nut terminals, the connections being on the front of the case. This battery is built with a 2¾-in. sediment space and a space of 2 in. allowed for the electrolyte over the tops of the plates. The outstanding feature of this particular type of battery is its light weight, which is said to be from 30 to 40 per cent of the weight of commonly used lead train lighting batteries. This battery uses a pasted type of plates with hard rubber perforated retaining sheets. It is possible to assemble the battery in two, three or four-cell trays in order to suit the space in different battery compartments.

The latest type of bus battery developed by this company is known as the Type PRT. This is constructed with extra heavy plates, eight ribbed threaded rubber insulators and unusually high sediment space.

Gun Iron Brake Drums for Automotive Equipment

TWO types of gun iron brake drums for automotive equipment which are being exhibited by the Hunt-Spiller Manufacturing Corporation, 383 Dorchester avenue, Boston, Mass., are shown in the illustrations. For the past two years, this company has been producing



Shaft Brake Drums Made of Hunt-Spiller Gun Iron

finished brake drums made of Hunt-Spiller gun iron which have been designed to withstand the severe braking conditions of interurban and suburban service. Brake drums of this material applied to both driving shaft and rear wheel brake drums are said to prolong the life of the brake lining and the drum itself.

New Mack Six-Cylinder Bus Engine and Chassis

THE International Motor Company, New York, has an exhibition in the Motor Transport Tent, its new six-cylinder Mack "AL" engine and bus chassis. The engine has a N.A.C.C. rating of 43.4 h.p. and a brake horsepower of 90 at 2,100 r.p.m. There is a high pressure oil line to the main bearings. The crankshaft is drilled through from the main bearings to the crank pin bearings, giving force-feed lubrication to all main bearings. The low pressure line runs to the splash

Mack Six-Cylinder Bus Chassis

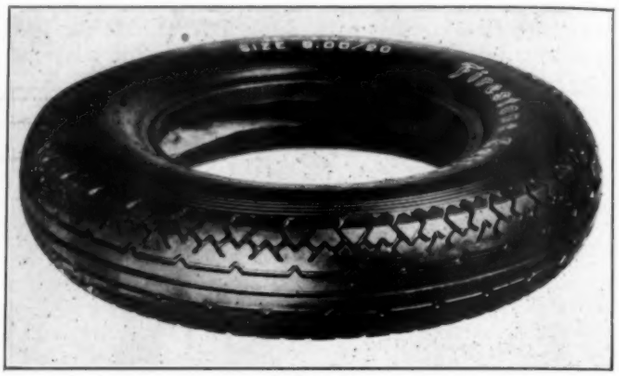
pans in the bottom of the crank case. The entire oil pump can be removed as a unit by removing four nuts at the bottom of the lower crank case.

The timing gears and the crank shaft are case-hardened. Rubber shock insulators replace steel spring shackles and bolts. The engine is seated on rubber pads, reducing excessive vibration. Instead of having both foot and emergency brakes working only on the rear wheel brake drums, one of the brakes operates on the drive shaft which is equipped with its own set of drums, giving the driver a choice of cool drums on which to do his braking.

The chassis is fitted with single front and dual rear steel disc wheels and heavy balloon tires. A spare wheel and tire are mounted on the chassis in a carrier at the rear.

Balloon Tires for Buses Developed by Firestone

AN 8.25 in. by 20-in. balloon tire for use on motor buses has been developed by the Firestone Tire & Rubber Co., Akron, Ohio. The carcass is built up of cord plies which are gum-dipped, impregnating the cords and insulating each fibre with rubber. After the



The Firestone Balloon Type Bus Tire

gum dipping the plies are calendered, this process forcing soft rubber into the meshes of the fabric and around the cords. A thin coat of soft rubber is then placed on each side of each ply of cord fabric.

The bead core is made of piano wire of highest tensile strength, and the ends of the chafer and tie-in strips are imbedded in a strip of rubber to fortify against loose action. The cord section and the tread are separated by a rubber cushion layer and a cushion of heavy breaker fabric, which distribute road shocks over a greater area of the carcass. The side walls and extra thick tread are of solid rubber, the latter being designed with many angles to prevent skidding. Extra rubber at the lower part of the side wall gives protection against bruise breaks. Like all Firestone tires, the balloon bus tire is oversize to give greater air volume and better cushioning.

* * *

Floodlighted Sign at Euston Station, London